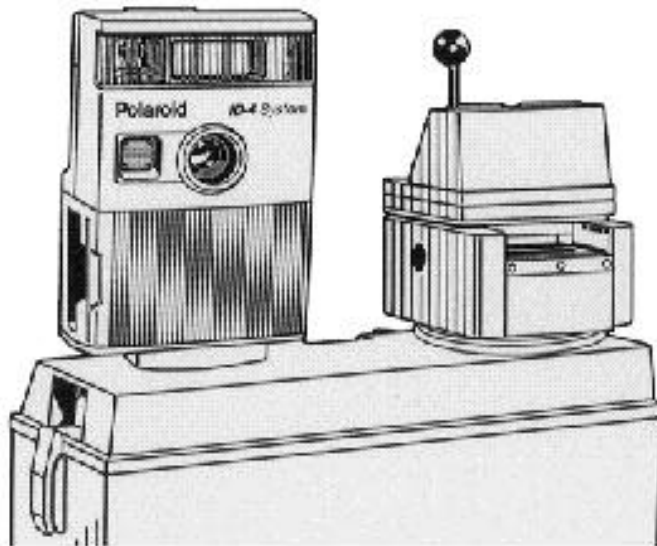




# **Polaroid**

## **Repair Manual**



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## **ID-4 Instant Photographic ID System**

January 1993

***Americas Business Center  
Technical Services  
201 Burlington Road  
Bedford MA 01730  
TEL: 1.781.386.5309  
FAX: 1.781.386.5988***

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# **ID-4 INSTANT IDENTIFICATION SYSTEM SERVICE MANUAL**

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## **SECTION 1**

### **OVERVIEW & SPECIFICATIONS**

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### A. System Overview

- The Polaroid ID-4 System is designed to produce highly secure photo-identification cards. The System includes a camera, laminator, and diecutter. These fit onto the base, which also contains the power supply.
- The camera photographs the subject's face and data card, and requires a validation plate, which may include a signature or seal for additional security.
- The ID photograph is inserted into the diecutter and cut to the appropriate size for the ID card. The laminator seals the die-cut picture into a protective pouch.
- The camera uses Polaroid Polacolor ER T669 or PC100 instant film. Each film pack produces eight 3&1/4 x 4&1/4 in. (8.5 x 10.8cm.) prints.
- The ID-4 System is available in four basic configurations:
  - Horizontal Two-up** (produces two horizontal IDs on each sheet of film)
  - Vertical Two-up** (produces two vertical IDs on each sheet of film)
  - Horizontal One-up** (produces one ID on each sheet of film)
  - Vertical One-up** (produces one ID on each sheet of film)Note: This camera is available by special order only.

Notes



## B. System Specifications

<b>Operating Power:</b>	Camera	115 VAC 50/60 HZ or 220 VAC 50/60	
	Laminator	115 VAC 50/60 HZ or 220 VAC 50/60	
<b>Strobe Recharge Time:</b>	10 Seconds, Maximum		
<b>Face Lens:</b>	4 Element, 114 MM, f4.5		
<b>Shutter Speed:</b>	7.8 + 2.7 msec.		
<b>Shutter Apertures:</b>	f4.5/ to f45		
<b>Camera-Subject Distance:</b>	Standard - 54" (1.4M) Close-up - 40" (1M)		
<b>DC Operating Voltages:</b>	Logic - 5.0		
	Strobes - 330		
	Motor & Solenoids - 16.0		
<b>Polaroid Film Types:</b>	661, 664, 668, T669P, POLACOLOR, POLAHYBRID		
<b>Camera Back:</b>	CB 103 Filmholder		
<b>Safety Certifications:</b>	Meets UL-122, CSA-C22.2 NO, 118, VDE/IEC 380 FCC PARTS 15, ANSI PH3.710 Standards		
<b>Weight:</b>	Actual Weight: 45 lbs.		
<b>Dimensions:</b>	Operating Mode (vertical camera)		
	H	W	D
	31.5"	23"	11.25"
	80.01cm	58.42cm	28.58cm
	Carrying Case with Base (handle folded)		
	H	W	D
	17.75"	23"	11.25"
	45.09cm	58.42cm	28.58cm

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## **SECTION 2**

### **SYSTEM COMPONENTS & THEORY OF OPERATION**



## Section 2 - Components & Theory

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Notes

## A. Sequence of Operation

This list includes three types of Operations or Events:

**Operator Actions (in bold type),**

Electro-Mechanical Events (in plain text), and  
*Prompts from the Display Panel (in italics)*

**Set Up System**

**Install Validation Plate**

**Load Film Pack**

**Power Up (Use Key)**

AC Power Indicator "On"

Timers Display "On"

*"Move Camera Back Prompt On"*

**Move Camera Back**

*"Insert Data Card" Prompt On*

**Insert Data Card**

Data Strobe Fires

Mirror Moves

*"Take Face" Prompt On*

Aim Light "On"

**Depress S1 (Range - Aim)**

Subject Distance is "checked" by sonar-system

**Continue to Depress S1-2 (Take Face)**

Shutter Operates

Face Strobe Fires

*"Move Camera Back" Prompt On*

**Move Camera Back**

*"Pull Film" Prompt On*

**Pull Film**

Note A: Prompt lights turn off after prompted action is taken.

Note B: The Sequence of Operation is also covered in the  
Troubleshooting Section of this manual.

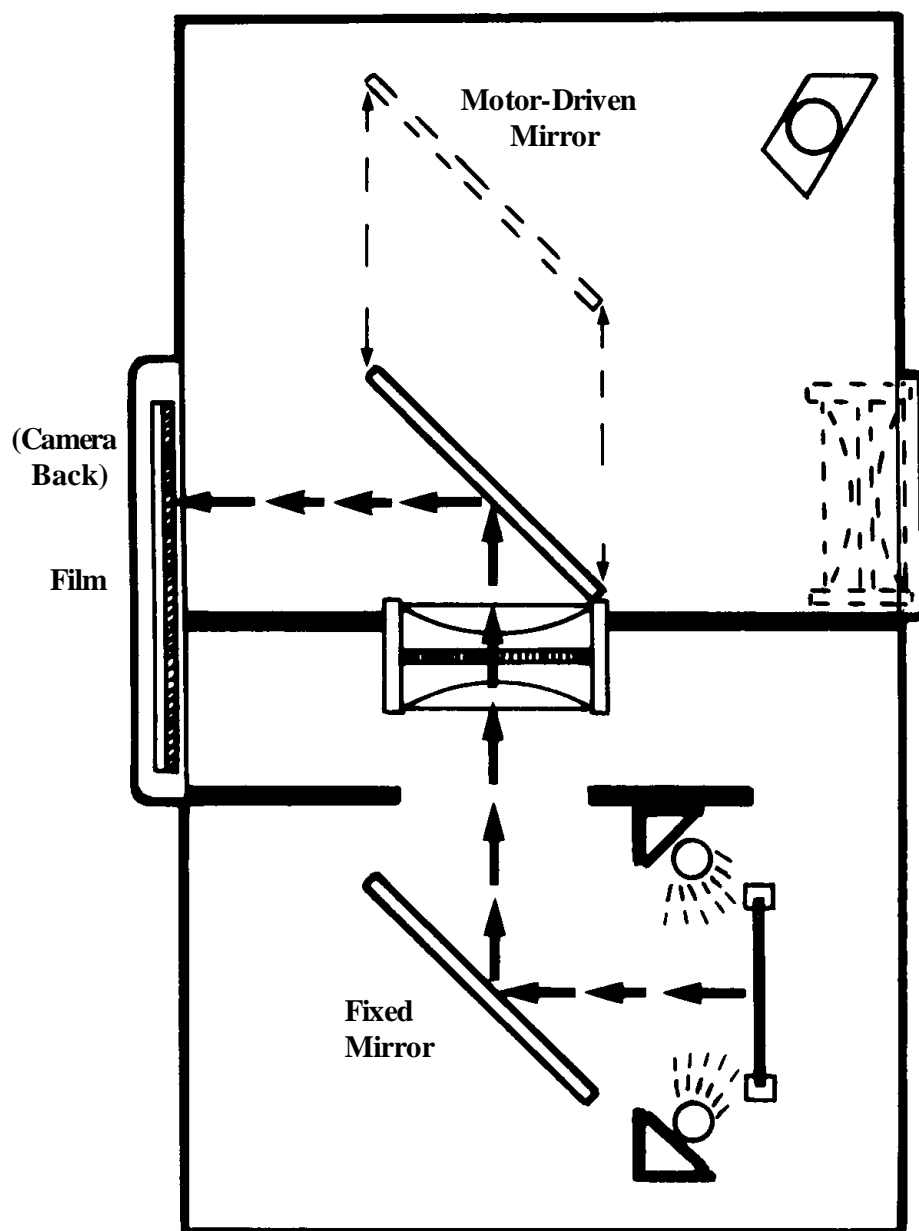


Figure 2-1 Data Exposure Image Path



## B. Optics

### 1. Data Exposure

#### 1a. Image Path

The Data Exposure Image Path is shown in Fig. 2-1.

*The Light from the Data Strobes:*

- Strikes the Data Card
- Reflects onto Fixed Mirror
- Passes through Fixed Aperture, Lens & Polarizer
- Strikes Motor-Driven Mirror
- Passes through Validation Plate
- Exposes Film

The Motor-Driven Mirror is mounted on a carriage driven either up or down by a small DC motor and gear train. Logic Circuit signals energize the motor and control rotational direction to move the mirror up and down. Before Data Card exposure, the motor drives the mirror into the lower position. Before Face exposure, the mirror is driven to its upper position to provide a clear path between the face lens and the film.

If the Data Exposure is too light or too dark, a potentiometer on the Operator Control Panel allows for the adjustment of the Data Strobe duration.

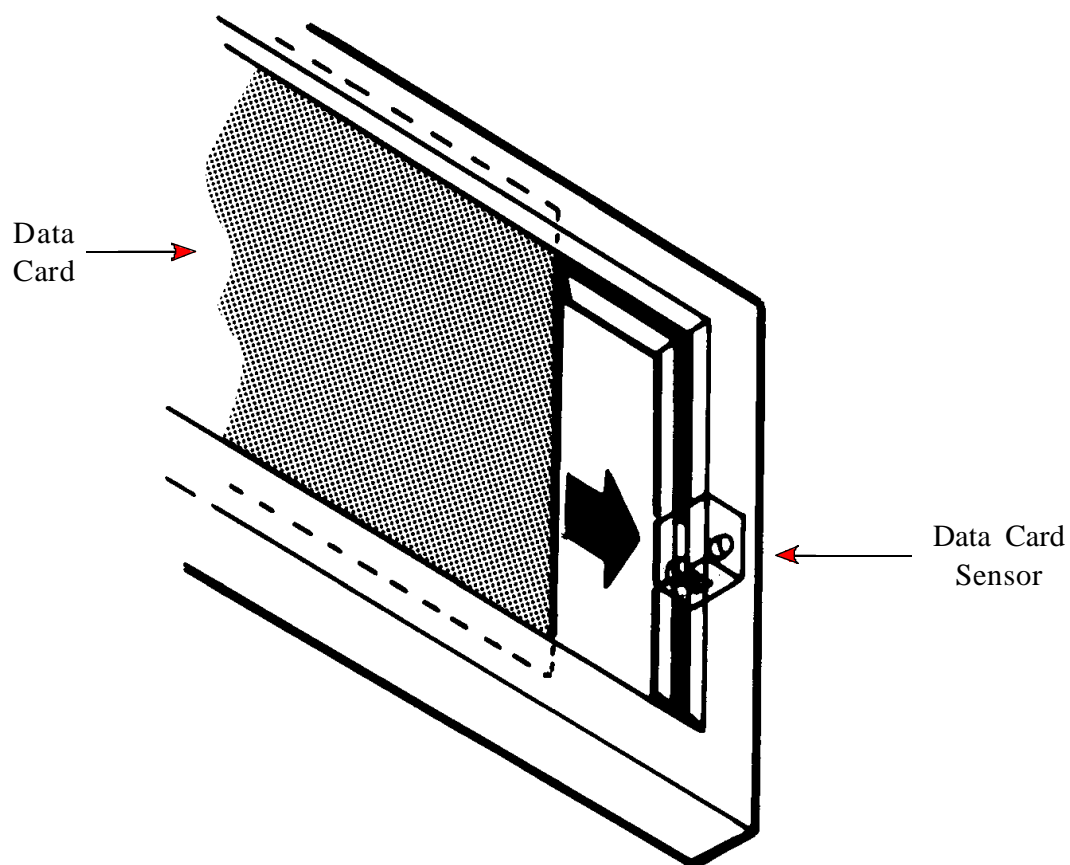
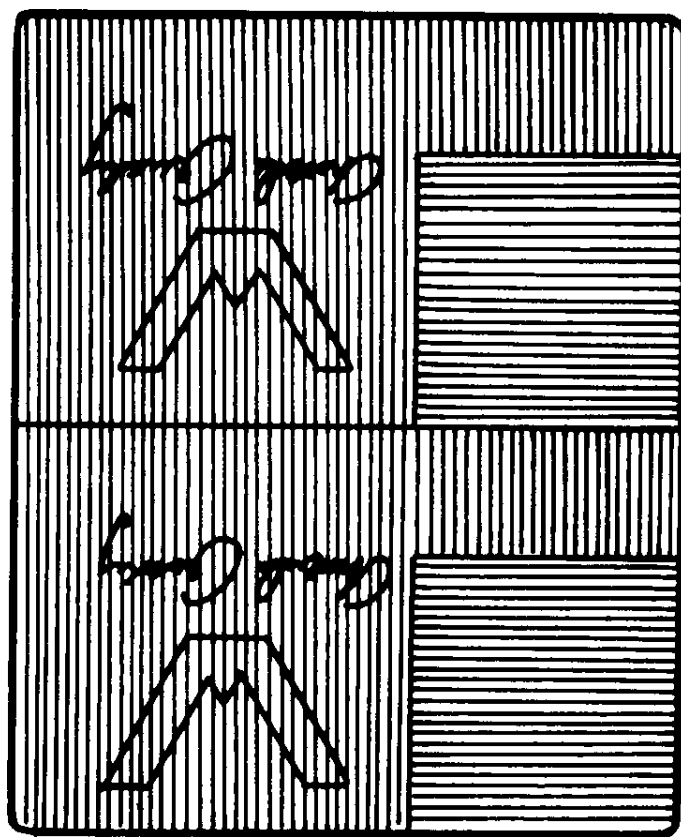


Figure 2-2 Data Card Holder

### 1b. Data Card Sensing

The Data Card Holder is shown in Fig. 2-2.

When an ID badge is to be made, a Data Card is prepared and inserted in the slotted Data Card Holder at the right front of the Camera. Presence of the Data Card in the Holder is sensed by an opto-interrupter in the Camera, which supplies the logic signal input necessary to turn on the Aim Light and fire the Data Strobe flashtubes.



Note: Be sure to insert Validation Plate in the direction shown above.

Figure 2-3 Validation Plate

## 2. Validation Plate

The Validation Plate is a Polarized plastic plate which is installed in the Camera Back by the operator.

*Validation Plate Functions:*

- To enable the exposure of the validating seal, signature or other security element onto the ID card
- To enable the exposure of the Portrait and Data on distinct and separate areas on the film

The "masking" by the Validation Plate is accomplished by polarizing its Data area surface in one plane, and its Face area surface in a different plane (see Fig. 2-3). When the Data exposure is made, a polarizing filter in the Data image path polarizes the light rays in the same plane as the polarized Data area on the Validation Plate. Thus the Data image light can pass through only the Data area of the Validation Plate, leaving the Face area unexposed and ready for the subsequent Face exposure. The same process occurs during Face exposure: the polarizer behind the Face Lens corresponds to the Validation Plate Face Area polarizer, permitting the face image to expose only the face area of the film.

The Validation Plate is in direct contact with the film during Data and Face exposures, and is lifted away to prevent scratching during movement of the Camera Back. A logic controlled solenoid moves the Plate into the film plane before the Data and Face Strobes fire, and away from the film after each exposure.

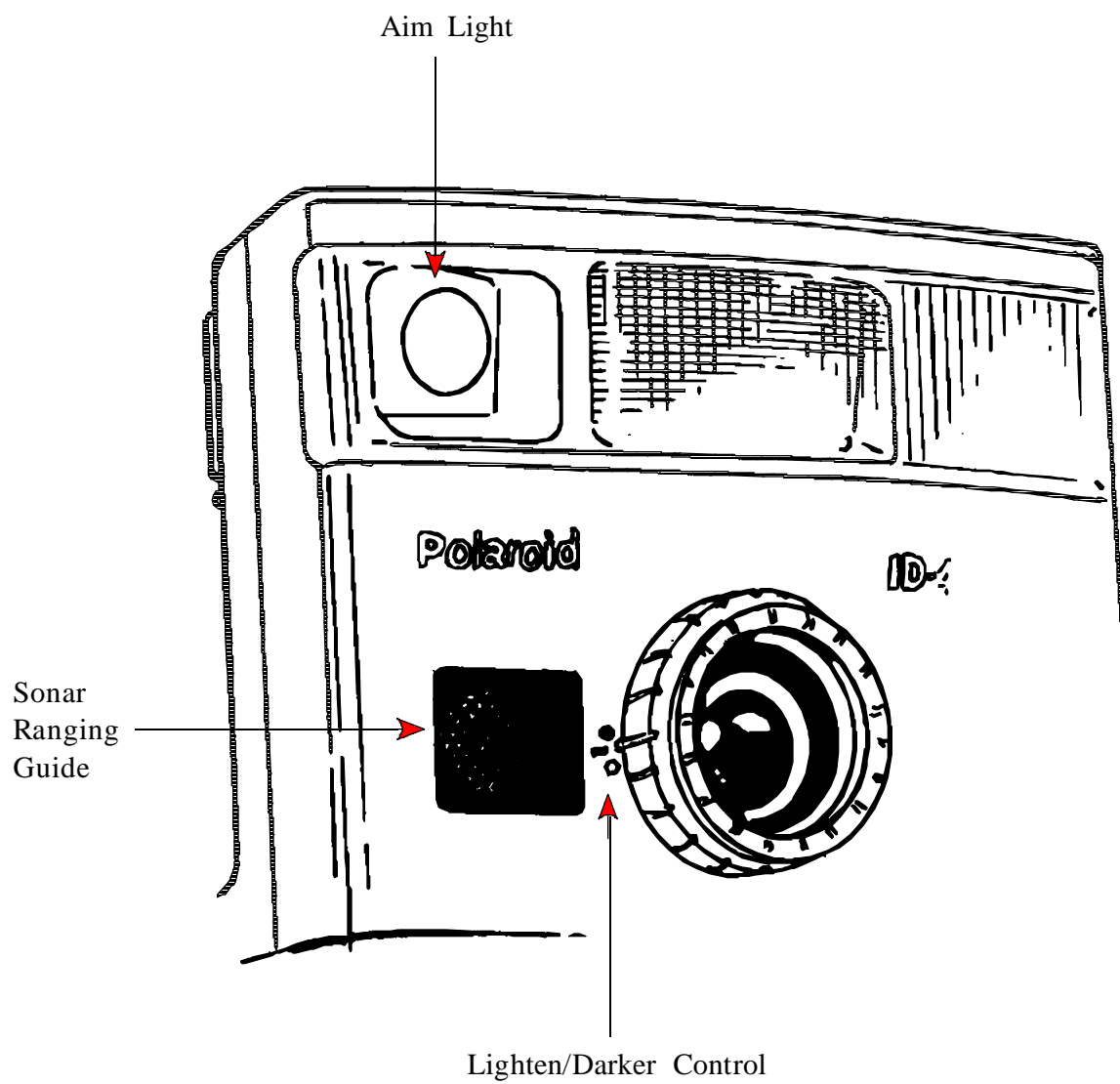


Figure 2-4 Aim Light/Sonar Rangefinder/Lighten-Darken Control

### 3. Portrait (Face) Exposure

#### 3a. Aim Light

The Aim Light is shown in Fig. 2-4.

*Aim Light Features:*

- Used to center the face image in the portrait area (should be aimed at subject's upper lip)
- Consists of a customer replaceable 16V bulb and lens assembly
- Emits a spot, one inch in diameter
- Shines for 10 seconds after Data Strobes have fired
- May be re-lit by partially depressing the shutter release

#### 3b. Sonar Rangefinder

The Sonar Rangefinder is shown in Fig. 2-4.

*Sonar Ranging Guide Features:*

- Assists the operator in positioning the subject at the correct distance from the Camera (see System Specifications for correct distance)
- Activated (with Aim Light) by partial depression of shutter release
- Does not inhibit Camera function

To signal the operator that the system is ready for the subject exposure, a green LED lights below the symbol for Shutter Button operation on the Control Panel.

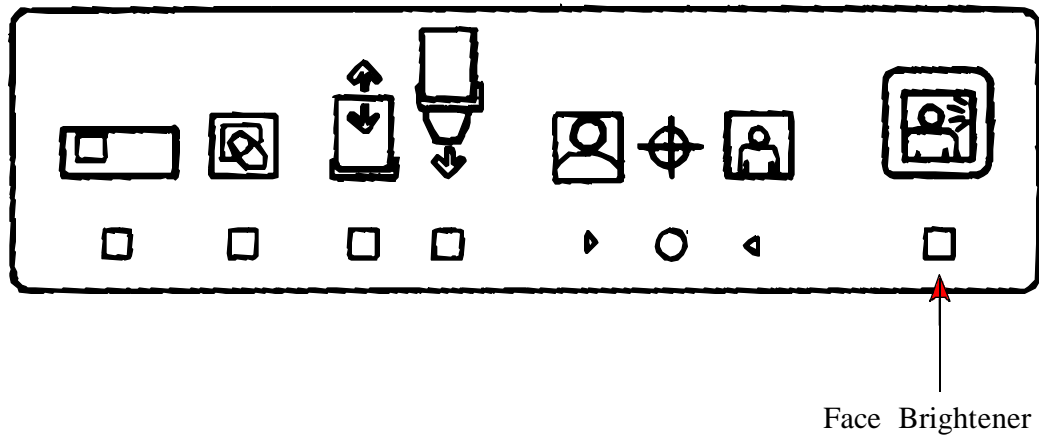


Figure 2-5 Display LED and Face Brightener (Two-Up Camera)

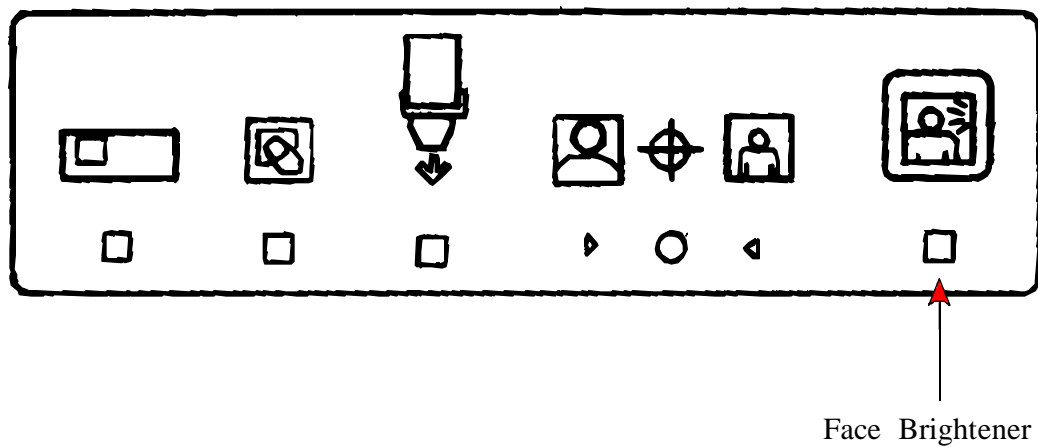


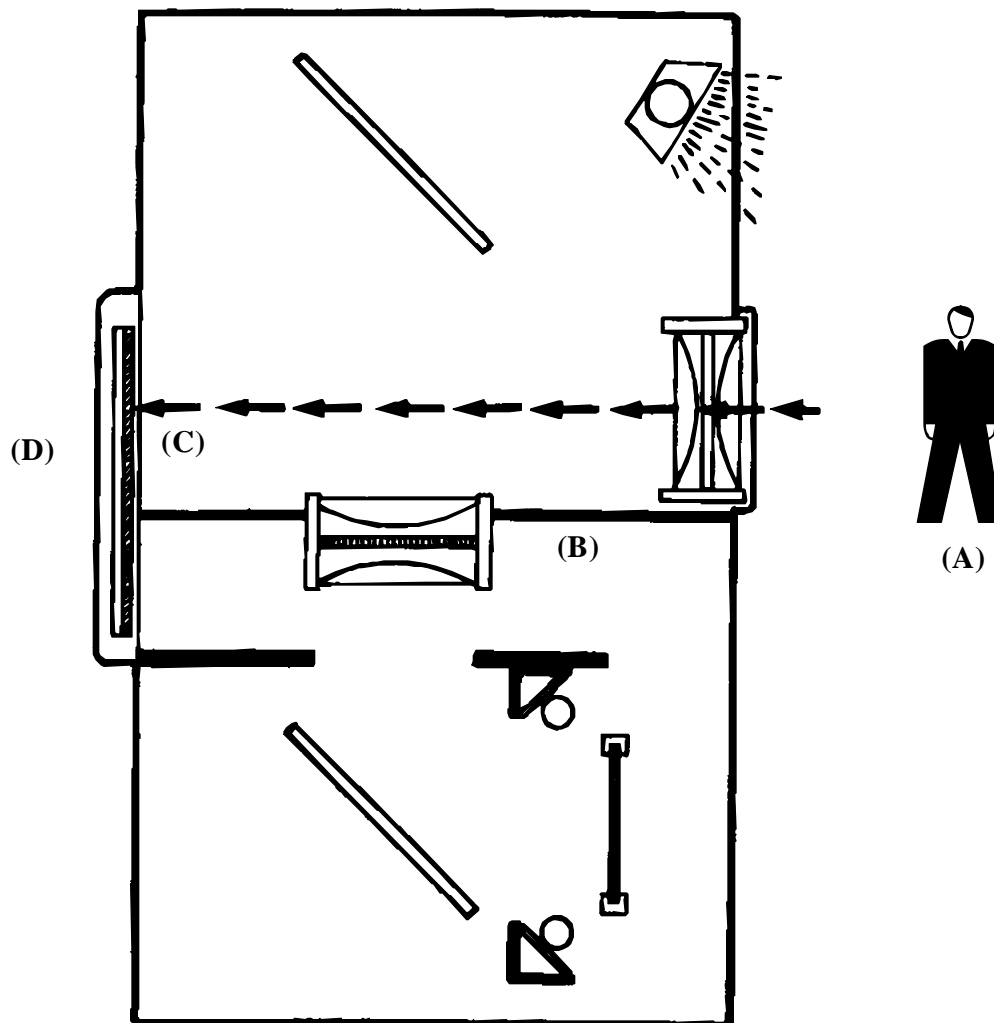
Figure 2-6 Display LED and Face Brightener (One-Up Camera)



### 3c. Face Exposure Adjustment

Two Camera Head controls are provided to achieve the best face exposure on the completed ID card. If the subject's image is too dark, a Face Brightener increases the facial illumination by one-half an f/stop. Pushing the face brightener symbol at the right end of the Control Panel (a soft key) activates the Face Brightener for the next exposure only (see Figs. 2-5, 2-6).

In addition, the Camera Head also has a Lighten/Darken control which will increase or decrease the shutter aperture by one-half an f/stop per detent. The aperture is adjusted by turning the lens bezel, either toward the "○" to lighten the exposure, or toward the "●" to darken. See Fig. 2-4.



- (A) Reflects from the Subject
- (B) Passes through the lens and polarizer
- (C) Passes through the polarized face area on the Validation Plate
- (D) Exposes the portrait area of the film

Figure 2-7 Face Image Path

### 3d. Image Path

When the two-stage shutter button is fully depressed, the face strobe fires and the face exposure is made. The shutter system is mechanically interlocked so that it is fully open when the face strobe circuit is energized.

*Face Optical System consists of:*

- Variable-aperture shutter
- Four-element lens system
- Image polarizing filter
- Validation Plate

The Face Image Path is shown in Fig. 2-7.

*The Light emitted by the Face Strobe:*

- Reflects from the Subject
- Passes through the lens and polarizer
- Passes through the polarized face area on the Validation Plate
- Exposes the portrait area of the film

Note: The motor-driven mirror which was in the "down" position for the Data exposure has now been moved up by a logic circuit control signal, to provide a clear path between the face lens and film in the Camera Back.

Notes

## C. System Power

### 1. Base Unit Wiring Connections

AC line voltage (115 VAC @ 60 Hz or 225 VAC @ 50 Hz) enters the ID-4 Base through Filter FL1 and keylock Switch S1, as shown in the Base Unit Wiring Diagram, Schematic A-1 (see Appendix). The line voltage supplies the AC Power ON indicator, the Power Supply through P1-J1, and the Laminator through J4. Overload protection of the Power Supply and Laminator is provided by circuit breakers CB-1 and CB-2.

### 2. DC Power Supply

The Power Supply for the ID-4 System is located in the Base Unit. The Base Unit Wiring Diagram is shown in Schematic A-2(1) (see Appendix).

There are two AC-DC transformers (T1 & T2) which supply DC power to the System. The Base Unit Power supply also includes an AC out for the Laminator. The four DC currents are described in the following table.

<i>Current</i>	<i>From</i>	<i>To</i>	<i>For</i>
8 VDC Unregulated	T1	Camera Connector	Camera Logic
5 VDC Regulated	T1	Film Developing Timers*	
16 VDC Unregulated	T2	Camera Connector	Face & Data Strobe Capacitors
16 VDC Constant Current	T2	Camera Connector	Aim Light

\* Back-up batteries are provided to preserve pre-set Timer values during power down periods.

Notes

### **3. Film Development Timers**

Two electronic LCD Timers are mounted on the Base Unit for convenience in timing the development of two prints. They operate on 5 VDC from the Power Supply and contain back-up batteries to preserve memory if AC power fails. Depressing a button on the Timer starts the countdown; an audible beep signals its completion. Timing interval is adjustable to accommodate different Polaroid films.

### **4. DC Voltage Distribution in the Camera Head**

As shown in Schematic A-3 (see Appendix), the Power Supply DC voltages at the Camera Connector are fed first to the Face Strobe PC Board in the Camera Head. From the Face Strobe PC Board, the required DC voltages are next sent to the Data Strobe Timing and Logic Boards.

The Logic Board, in turn, supplies the voltages required by the Display LEDs; distance-measuring Sonar; solenoids for the Shutter, Validation Plate, and Face Brightener aperture; Camera Back and Data Card position sensors; the mirror Drive Motor; and the Camera exposure Counter.

Notes

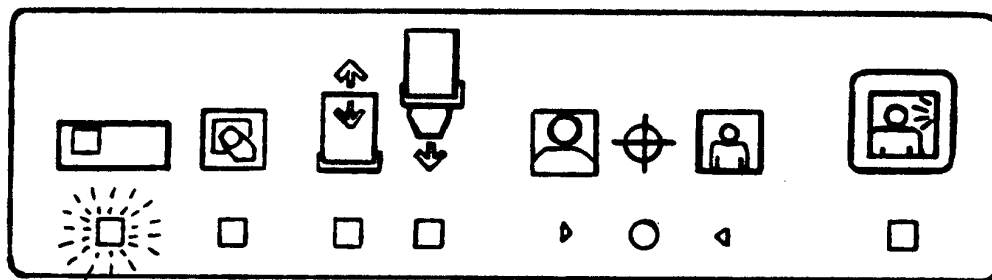


## **D. Operator LED Display/Control Panel**

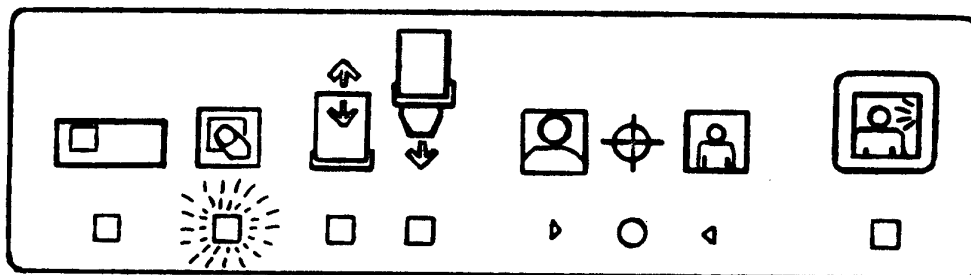
The Operator Control Panel LEDs and their functions are shown on the following two pages. The four LEDs on the left-hand page (Fig. 2-8a) are operator prompts, and the action indicated must be taken before Camera operation can continue. The four on the right-hand page (Fig. 2-8b) do not inhibit Camera operation.

Note: The Operator Control Panels shown are for a Horizontal Two-up camera. Yours may differ slightly.

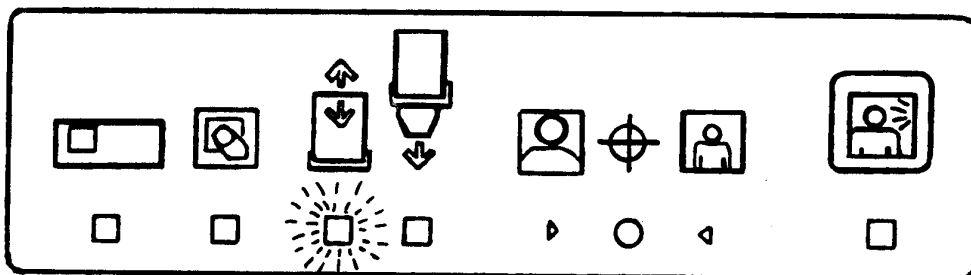
The LEDs also function as signals of System errors requiring power down and/or servicing. The first and last LEDs alternately flash and a combination of the other LEDs illuminates. These codes and conditions are described in the Operator Panel Error Display Codes in the Diagnostics & Troubleshooting section of this manual.



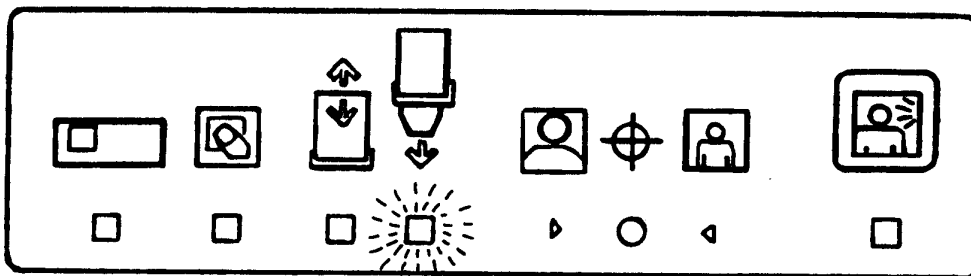
Green Light – *Insert Data Card*



Green Light – *Fire Face Strobe*

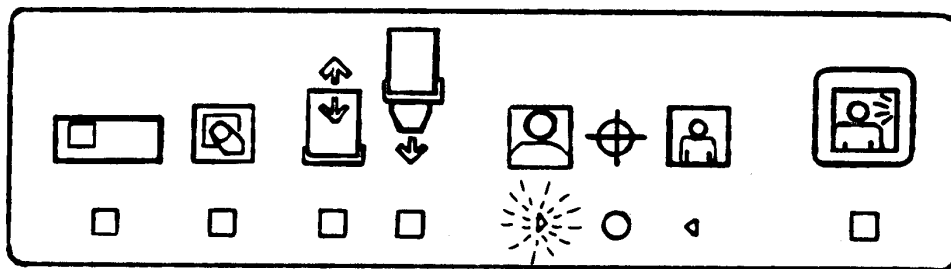


Amber Light – *Move Camera Back*

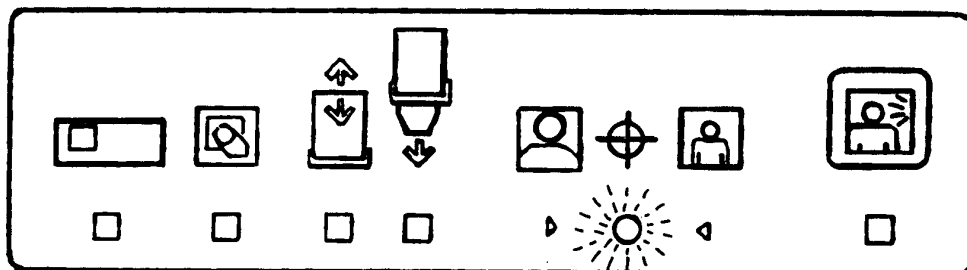


Amber Light – *Pull Film*

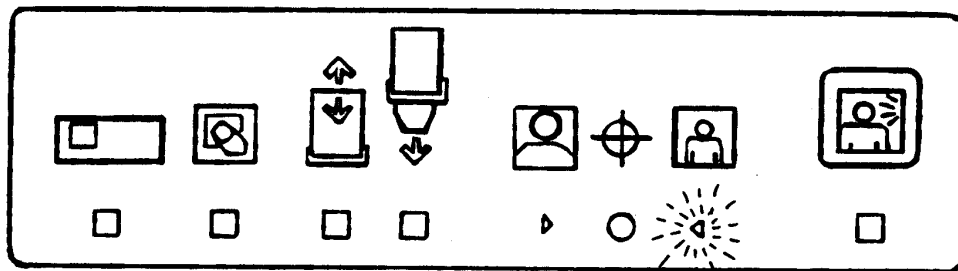
Figure 2-8a LED Indicator Panel Lights – Operator Prompts



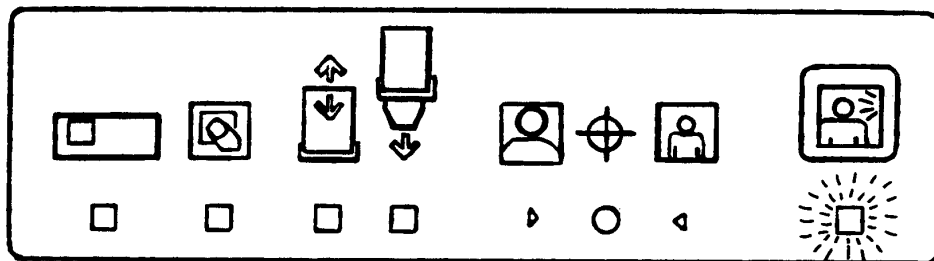
**Amber Light** – *Subject Too Close*



**Green Light** – *Subject Distance Correct*



**Amber Light** – *Subject Too Far*



**Green Light** – *Face Brightener "On"*

Figure 2-8b LED Indicator Panel Lights

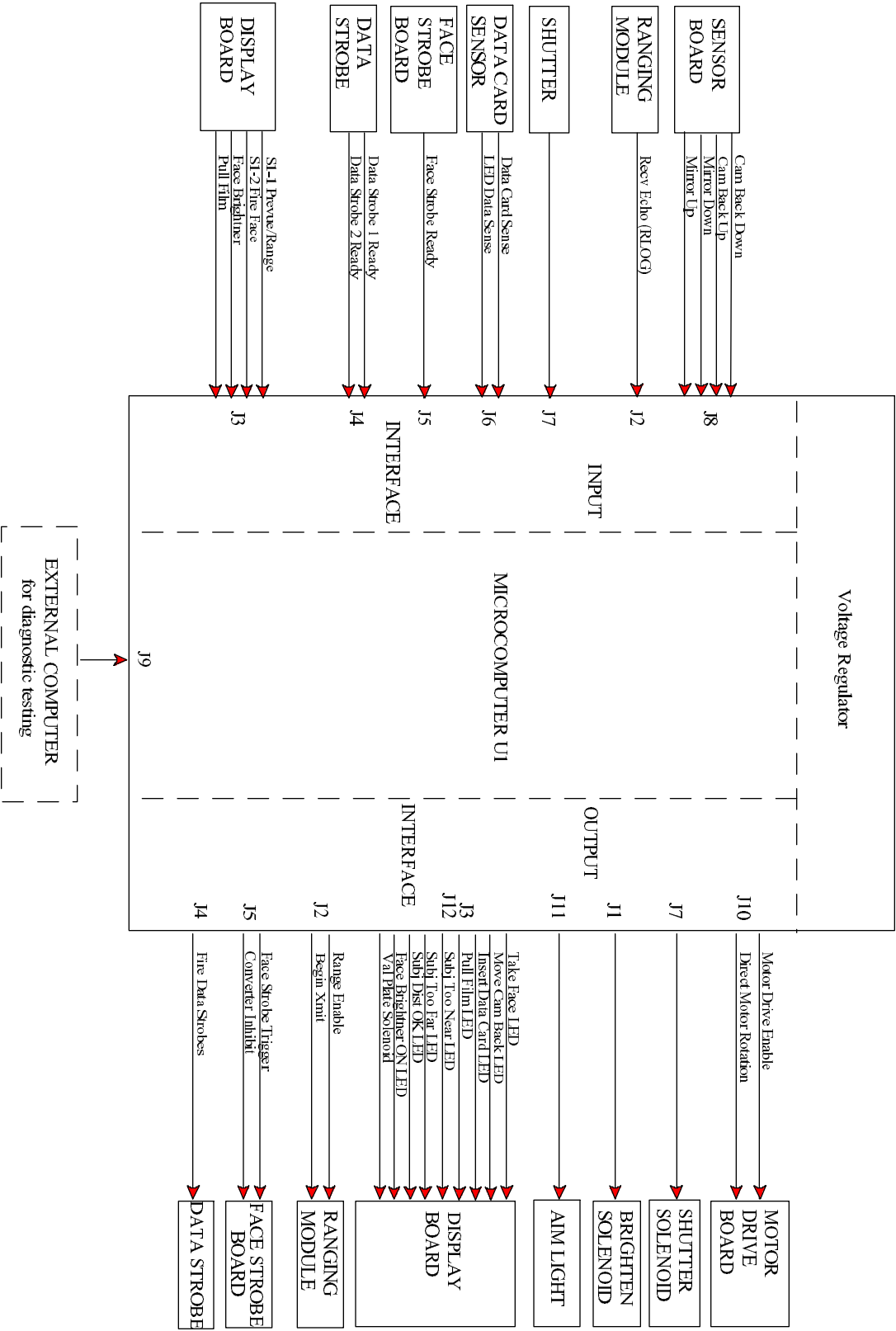


Figure 2-9 Logic Circuit Blocks

## E. Camera Electronics

### 1. Logic Circuit

The Logic Block Diagram (Fig 2-9) shows the Inputs and Outputs of the Logic Circuit. Microcomputer U1 is the heart of the Logic Circuit, coordinating and controlling all events in the camera cycle through resident software. (See "F. Software Control of System Operation.") Additional information on the function of U1 is provided in The Program Flowchart (Schematic A-4) and the Timing Chart (Schematic A-5) in the Appendix.

The clock pulse required for the timing functions performed by U1 is supplied by Crystal Oscillator Y1 (Fig. 2-10). Reset at power up is provided by R19 and C1. When Vcc is first applied to the Logic Circuit, C1 is in a discharged state and 5V is applied to pin 9 (RST), placing all outputs in an OFF state. C1 is charged through R19 to make pin 9 low and permit operation of the IC. (See Logic Board schematic [A-6] in the Appendix.)

The Logic Board has its own 5V regulator (U12) for Vcc, which also supplies 5 VDC to the Display and Sensor PC Boards (see Fig. 2-11).

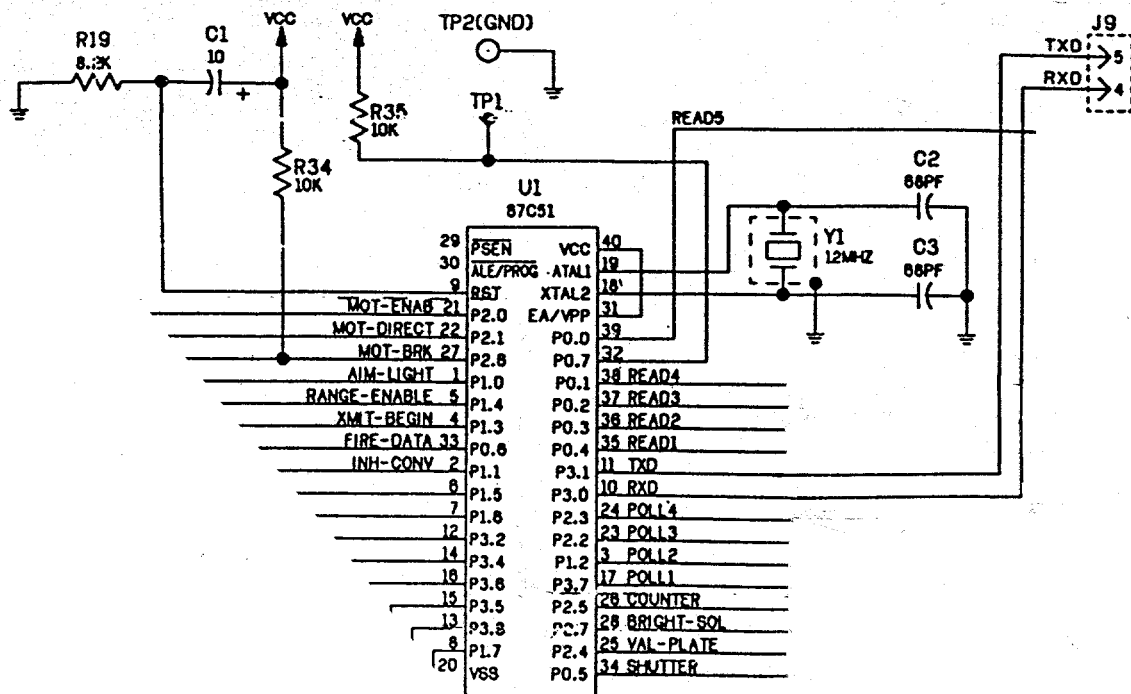


Figure 2-10 Microcomputer Power Input, Computer Interface and Clock Input

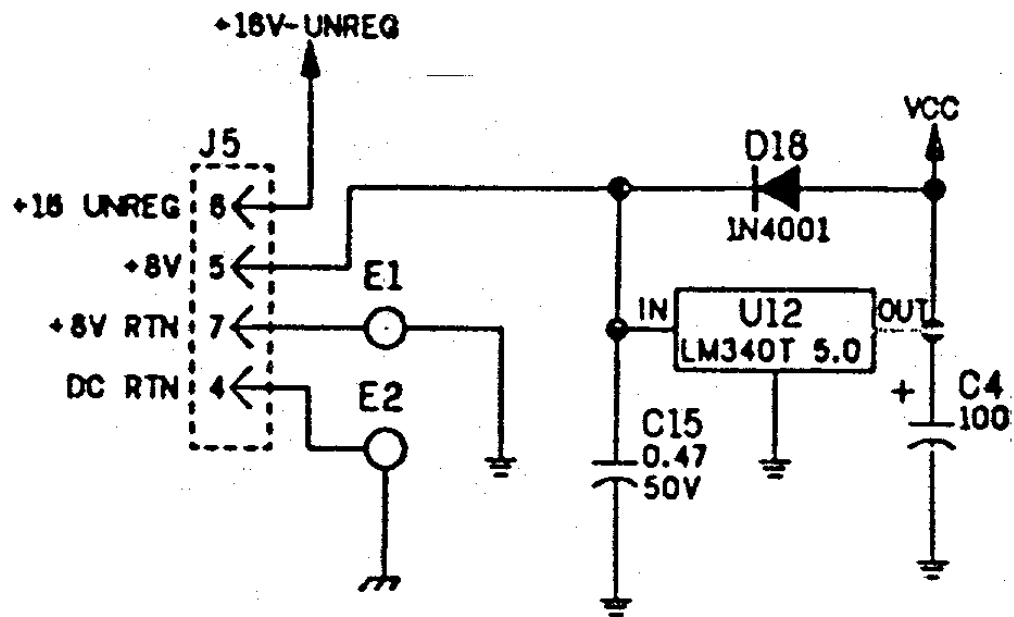


Figure 2-11 Logic Board 5 VDC Regulator Circuit

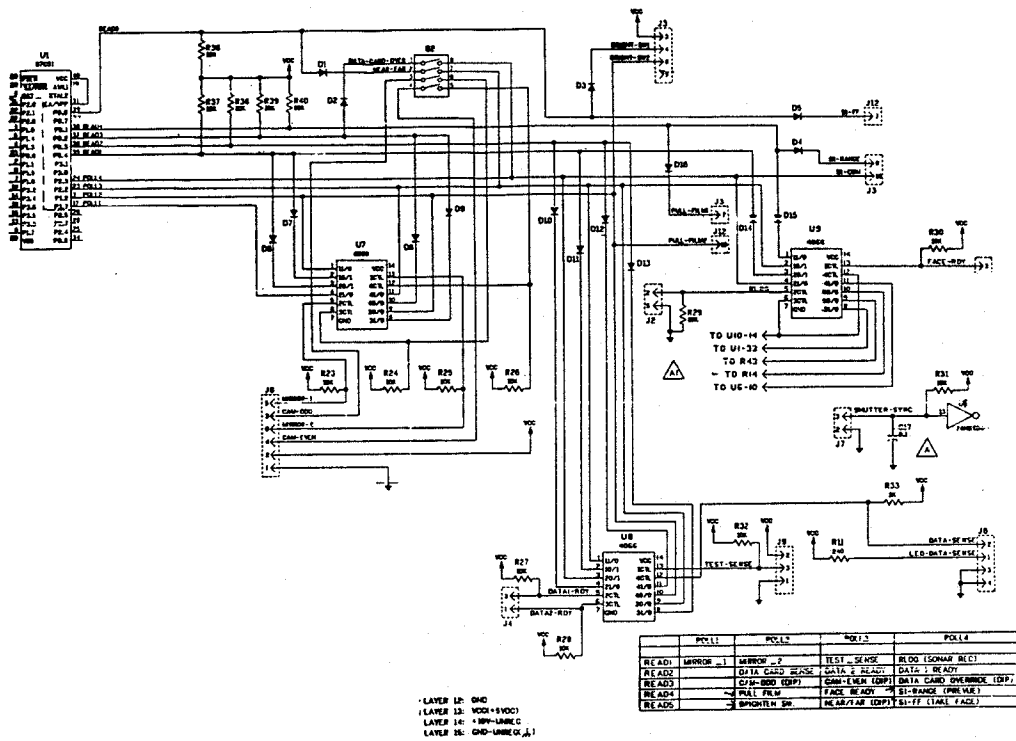


Figure 2-12 Logic Circuit Inputs

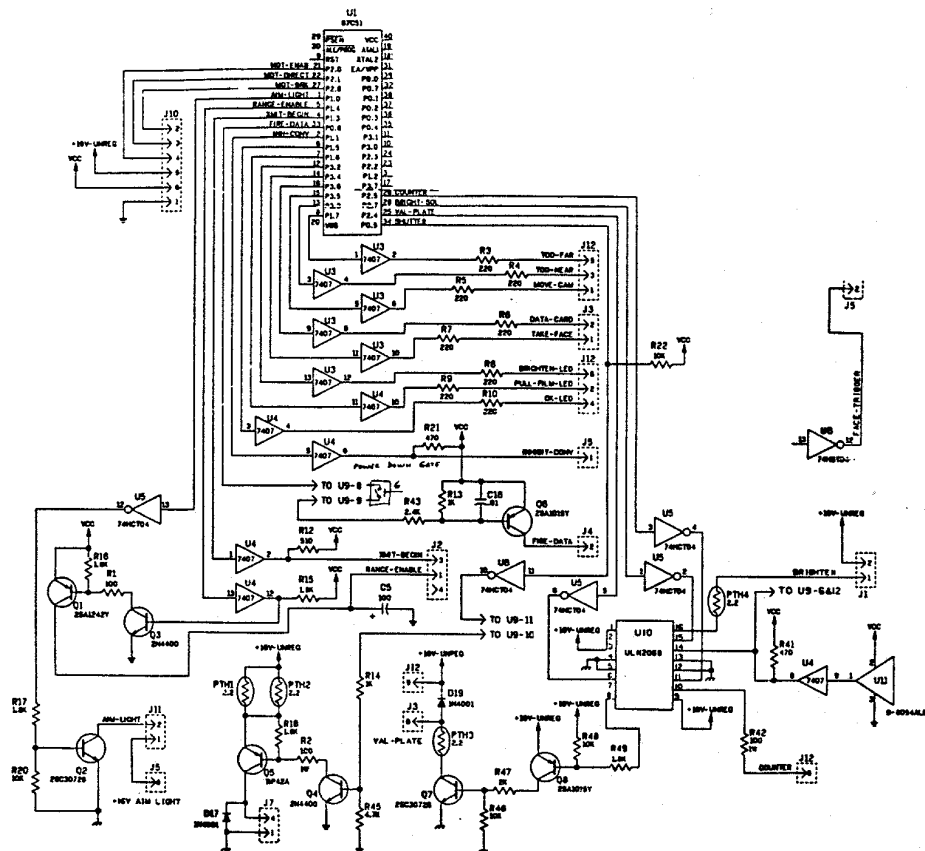


Figure 2-13 Logic Circuit Outputs



*Inputs to the Logic Circuit (Fig. 2-12) include:*

- Logic Inputs high or low
- Closed Circuit Loops  
ex. Face Brightener (J3-4,-8) & Pull Film (J3-7, J12-10)
- Shutter Synchronization Signal (through J7)

*Outputs from the Logic Circuit (Fig. 2-13) include:*

- Buffered Signals  
ex. Too Close (J12-5), Too Near (J12-3),  
Move Camera Back (J12-1)
- Unbuffered Signals  
ex. Motor Drive Controls:  
MOT-ENAB, MOT-DIRECT, MOT-BRK
- Current Limiting  
[Shutter Solenoid (J7-4,J7-1)]

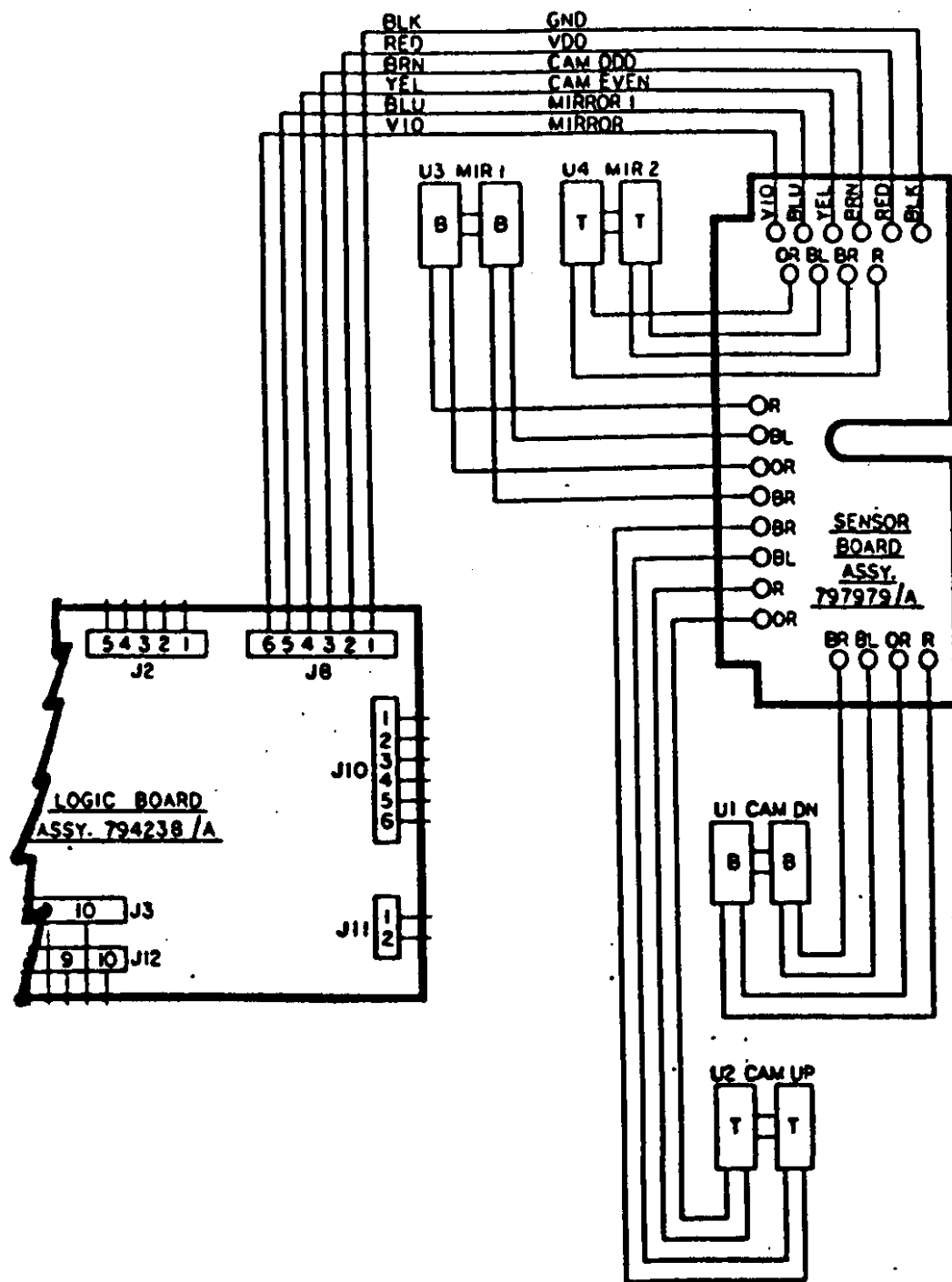


Figure 2-14 Sensor PC Board Interconnections

## 2. Photo Sensors & Sensor PC Board

Four Photo Sensors are used in the ID-4 to sense the positions of the Mirror and the Camera Back (see Fig. 2-14).

### 2a. MirrorPosition Sensors

U3 MIR 1 and U4 MIR 2 are the Mirror Position Sensors. As the motor drives the Mirror carriage from one position to another, tabs on the carriage intercept the cavities of U3 and U4. The Logic Circuit control program uses these position signals to ensure that the Mirror is in the correct position when the Data Card and Face exposures are to be made, and to measure Mirror Move Time.

<i>Mirror Position</i>	<i>(Sensor Output)</i>	
	<i>U3</i>	<i>U4</i>
Down (Data Position)	High	High
Up (Face Position)	Low	Low
In Between	Low	High

### 2b. CameraBackPosition Photo Sensors

U1 CAM DN and U1 CAM UP are the Photo Sensors for the Camera Back position. When the operator slides the Camera Back from one position to another after taking a picture, a tab on the Back moves out of the cavity of one sensor and into the cavity of another. The resulting sensor outputs are fed through the Sensor Board to the DIP Switch S2-3 and S2-4, analog switch U7 and Microcomputer U1 on the Logic Board.

### 2c. SensorPC Board

The Sensor PC Board is essentially an interconnecting board between the Sensors and the Logic Board. As shown in Schematic A-7 (see Appendix), the circuit includes four current-limiting resistors, R1-R4 for the LED portions of the photo sensors.

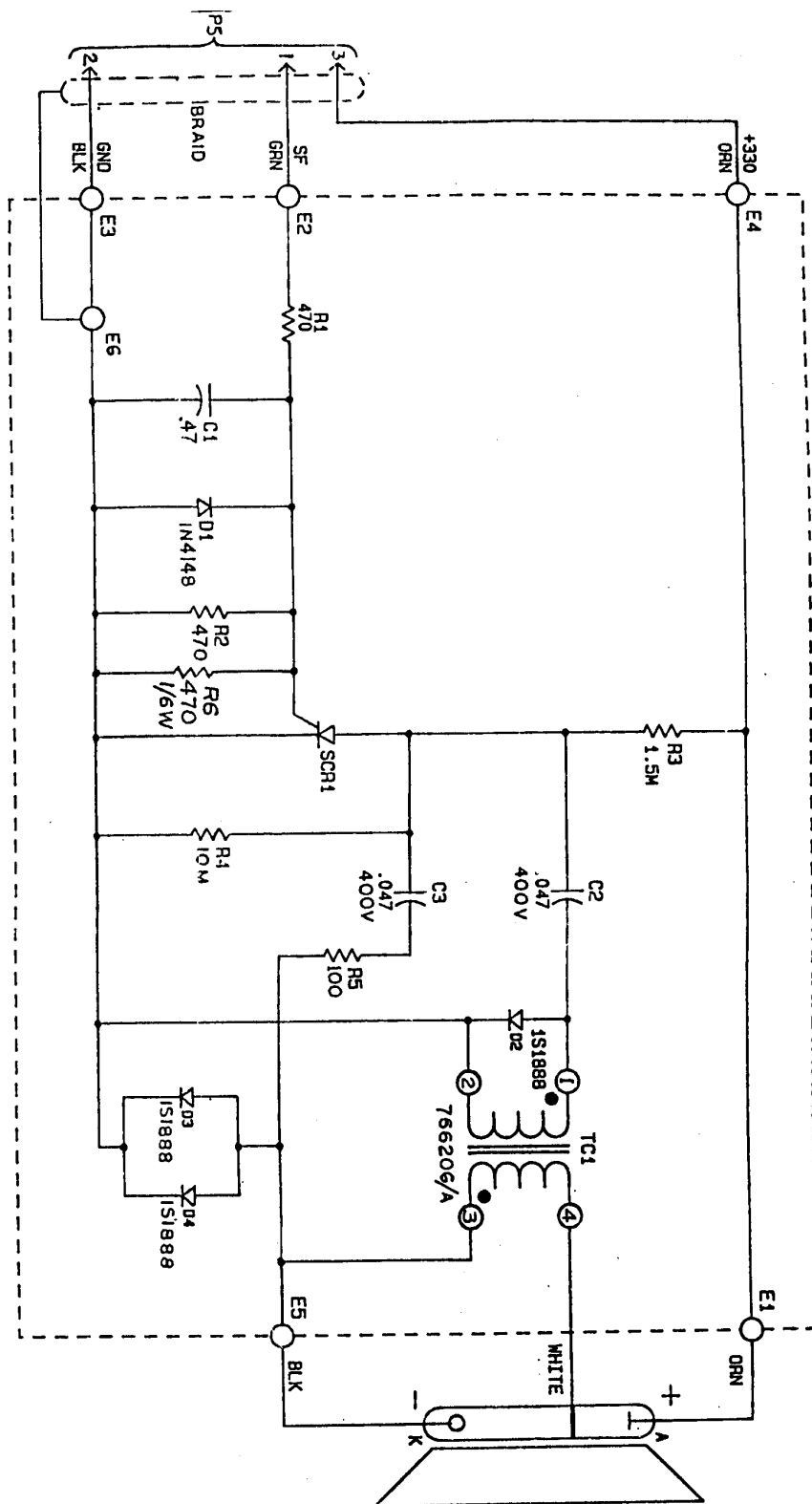


Figure 2-15 Face Strobe Trigger Circuit

### 3. Face Strobe Circuit

The Face Strobe circuit is shown in Fig. 2-15.

#### *Face Strobe Circuit Features:*

- 16VDC unregulated is converted up to 330VDC for the Face and Data photoflash capacitors via oscillator Q1-Q4 and diodes D1-D4 and step-up transformer T1.
- Regulation of 330VDC is controlled by ZD2 & ZD3 which turn on Q7 to inhibit charging.
- Face Ready signal is controlled by ZD1 turning on Q6.
- U1 regulates the 8VDC to 5VDC for K1 relay.
- K1 relay closes, when de-energized. This discharges the Face photoflash capacitors (C1 & C2) and the Data photoflash capacitors (C5 & C7 on the Data timing board), through R8 & R17.
- When Q5 is turned on\*, the oscillator is inhibited from charging.

#### *\*Q5 turns on when:*

- Face, Data 1, & Data 2 ready signals received at the logic board microcomputer send a high signal (E7) through D9 or
- Face Trigger signal is sent through D11 or
- K1 stays closed and activates D13

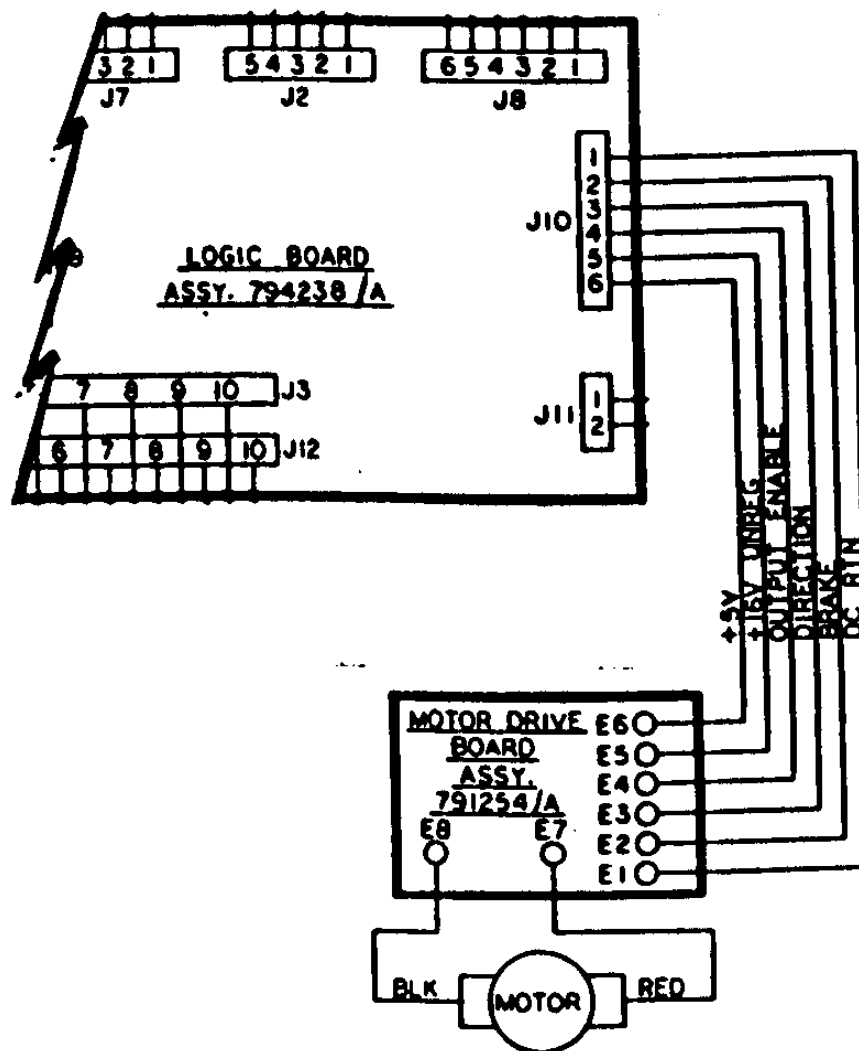


Figure 2-16 Motor Control Board Interconnections

## 4. Motor Control Board

The Motor Control Board consists of voltage regulator U1 and motor driver U2 shown in Fig. 2-16. Components U1, R1, R2, and C1 reduce the 16 VDC unregulated to 10 VDC for the Motor. U2 is a driver IC which, by Output Enable and Direction signals, delivers the correct polarity to the mirror drive Motor from the Logic Board.

## 5. Face Strobe Trigger Board

The Face Strobe Trigger Board is mounted with the Flashtube and reflector. E2 is the Strobe Fire Signal from the Logic Board through the Face Board. When E2 goes high, SCR1 turns on. This provides a ground to discharge the Trigger capacitor C2 through the primary of TC1 which ionizes the flash tube. See Fig. 2-15.

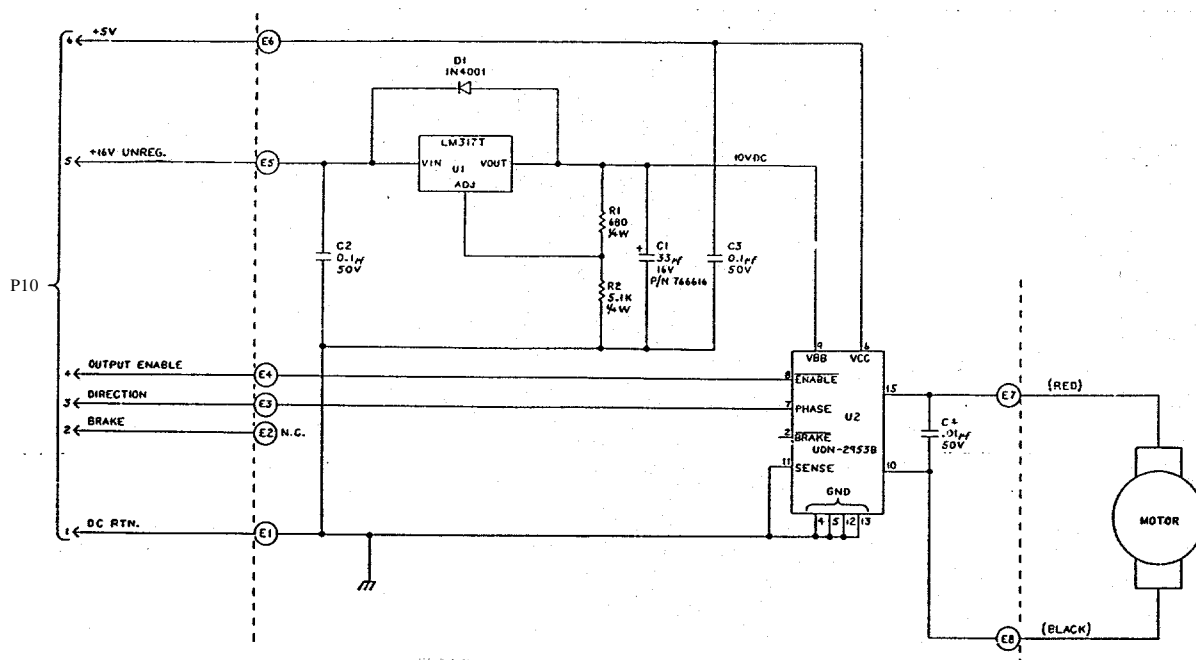


Figure 2-17 Motor Control Board Schematic

Notes



## 6. Data Strobe Circuit

The Data Strobe Circuit includes the Quench Board and the Timing Board, which are shown in Schematic A-8 (see Appendix).

*The Quench Board contains:*

1. The trigger circuits for the Data Flashtubes
  - trigger capacitors C3 & C5
  - trigger coils TC1 & TC2
  - SCR2 common to ground C3 & C5
2. The Quench Circuit
  - the high signal from E13 through DTH1 (opto-isolator) which grounds the 330V through choke L1

*The Timing Board contains:*

1. Data Photoflash capacitors C7 & C8
2. Data 1 & Data 2 ready circuits
  - ZD1 & Q10 for Data 1 ready
  - ZD2 & Q9 for Data 2 ready
3. Quench signal time constant adjustment and signal (VR1, Q5, Q6 & Q1)
4. The data fire pulse (Q2, Q3, Q7 & Q8)

Notes

## **7. Ranging Module**

The Ranging Module schematic is shown in Schematic A-9 (see Appendix).

This Module provides the ultra-sonic pulse transmission and echo reception from which the Logic Board computes Camera-to-Subject distance. The primary components of the Ranging Circuit are ICs U1 and U2, power transistor Q1, output transformer T1 and the Transducer.

The Module is powered through J2-1 (Range Enable on the Logic Board). Transmission begins when J2-3 (XMIT-BEGIN) goes high. The Ranging Module Transducer transmits an ultrasound burst of 1  $\mu$ sec, then waits for an echo.

The echo is detected through pin 1 U1 on the Ranging Module. This causes pin 9 of U2 to go high, and in turn, pin 2 (RLOG) of J2 on the Logic Board. Microcomputer U1 on the Logic Board then measures the elapsed time between transmission and reception, and calculates Camera-to-subject distance from the time.

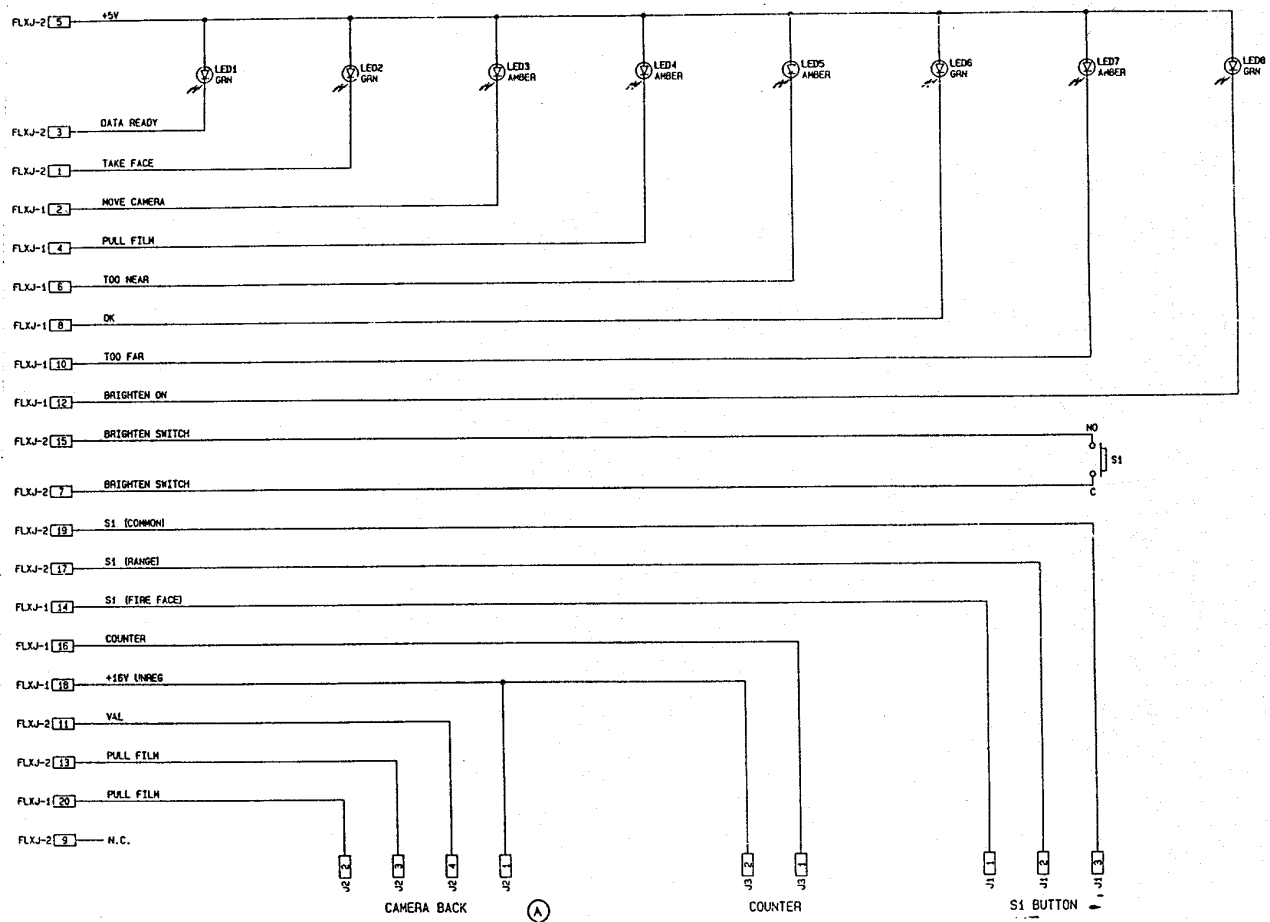


Figure 2-18 Display Board Circuit

## 8. Display Board

The Display Board is shown in Fig. 2-18.

### *Display Board Functions:*

- Provides System status displays for the operator
- Controls the Face Brightener Switch & its indicating LED
- Provides feed-through connections to the Logic Board for the camera back counter & switch S1\*

\* S1 is a soft-switch at the end of the panel, which when closed lights the Face Brightener LED (8) and actuates the Face Brightener Solenoid through Logic Board Circuitry, for the next exposure only.

Signal/operating voltage lines between the Logic Board and the S1 Button (Ranging and Fire Face Strobe), Pull Film microswitch and Validation Plate solenoid on the Camera Back, and the Counter, are also made through connections on the Display Board.

Notes

## 9. DIP Switch S2 on Logic Board

Position 1: Data Card Override  
Position 2: Camera-Subject Distance  
Position 3: Moveable Back 1  
Position 4: Moveable Back 2

*The four Positions on DIP Switch S2 should be set as follows:*

Position 1 OFF: Data Exposure occurs only after inserting Data Card.  
Position 1 ON: Camera makes second Data Exposure without removing and replacing Data Card. Second exposure occurs after moving the Camera Head down. (Used when two IDs of same subject are needed.)  
  
Position 2 OFF: Standard Lens in use. Camera 54" from subject.  
Position 2 ON: Close-Up Lens ( #663 ) in use. Camera 40" from subject.

*Positions 3 & 4 must be set together.*

Position 3&4 OFF: Camera has Fixed Back.  
Position 3&4 ON: Camera has Moveable Back.

Notes



## F. Software Control of System Operation

### 1. Control Program - Basic Operation

A software program resident in the Logic Board's microcomputer primarily serves two purposes in the ID-4 system:

- (a) Helps automate the process of producing ID badges, by making a software program responsible for timing and monitoring the overall flow of picture-taking steps;
- (b) Enhances the ID-4's productivity by assuring circuit readiness and providing operator prompts throughout the operating sequence.

Below are brief explanations of what the two main sections of the program do. The sequence of these functions can also be visualized by referring to the Program Flowchart (Schematic A-4) and the Timing Chart (Schematic A-5) in the Appendix.

In addition, a third part of the ID-4 software permits diagnostic testing of individual Camera functions, using an external computer. This capability is described at the end of this section.

	POLL1	POLL2	POLL3	POLL4
READ1	MIRROR 1	MIRROR 2	TEST SENSE	RLOG (SONAR RECEIVE)
READ2		DATA CARD SENSE	DATA 2 READY	DATA 1 READY
READ3		CAM ODD (DIP)	CAM EVEN (DIP)	DATA CARD OVERRIDE (DIP)
READ4		PULL FILM	FACE READY	S1 RANGE (PREVUE)
READ5		BRIGHTEN SW	NEAR/FAR (DIP)	S1 FF (TAKE FACE)

Figure 2-19 Sequential Interrogation Matrix

## 2. "Interrupt" Functions

This portion of the software controls the basic timing, reads and stores microcomputer inputs, and monitors or controls critical events in the Camera cycle.

"Interrupts" are generated once every millisecond (every 250  $\mu$ sec during sonar distance ranging) by an internal timer in microcomputer U1. A software timer determines the timing of all solenoid actuation, strobe fire, ranging, strobe recharging, etc.

This section of the control program also continuously tracks of "polls" 16 conditions in the Camera Head every millisecond. This assures that the Logic Section of the software will always be using up-to-date information as it controls the overall flow of operations.

The matrix (Fig. 2-19) depicts these sequential interrogations of the group of inputs READ1 through READ5. At POLL1, the states of all five inputs (READ1 through READ5) are instantaneously sensed and stored, in BCD form, in four registers of microcomputer U1. (At POLL1, only Mirror position 1 is looked at.) One-quarter millisecond later, at POLL2, five inputs are again sensed and stored. The process is repeated at POLL3 and again at POLL4, at which time the series of four interrogations begin again. The process might be visualized as four snapshots (POLLs) in rapid sequence, with each snapshot recording the states of five variables (READs).

In addition to the states and events shown in the matrix, the microcomputer also monitors and controls the Aim Light 10-sec. timeout, the Mirror 2-sec. timeout, and the 15-sec. Strobe Ready timeout.

Notes

### **3. Logic Section Functions During Power Up**

The control program first places all outputs of the microcomputer in an OFF state, sets the internal timers and enables the interrupts. Flags are set to initial conditions and power supplies are allowed 250 msec. to stabilize. The Converter Inhibit Line is turned off, allowing the 16 VDC to 330 VDC Converter to charge the Date and Face Strobe capacitors.

The program next checks the Test-Sense input (U8, pin 13) on the Logic Board (see READ1, POLL3 in the preceding matrix). If the input is ON, the regular ID card program continues. But if the input is switched OFF, the "Test" functions are active and the program then jumps to the "TestRoutines" sub-program. This diagnostic facility is described at the end of this section.

The Face Strobe and Data Strobes are then checked for full charge with a 15-second timeout. The Mirror motor drive is energized to place the Mirror in its lower Data Card exposure position.

And finally, the four sections of the factory-set DIP Switch S2 on the Logic Board are checked, so the remaining control program will know:

- whether automatic second Data Card exposures should be made - S2-1 ("Data Card Override" - see READ3, POLL4 in matrix);
- whether near-focus or far-focus lens is in use - S2-2;
- whether the Camera Back is moveable or fixed - S2-3,4.

Notes

#### **4. Logic Section Functions During Data & Portrait Exposure**

The control program now progresses through all steps necessary to produce two ID cards on a single sheet of film, including prompting the operator and waiting when a manual operation must be performed. The sequence of these steps and LED displays (prompts or system errors) is most easily understood by looking at the flowchart, Schematic A-4 (see Appendix), which shows the steps necessary to produce one ID card or badge. In a two-up system (two cards per film sheet), the entire Data Card-Face Exposure process is repeated, after moving the Camera Back either up or down. The internal counter in microcomputer U1 then increments to "2" ("Cam Even" input on the Timing Chart), causing the PULL FILM LED to light.

The time-relationship of the events to each other is visually depicted in the Timing Chart, Schematic A-5 (see Appendix). (Bear in mind that most Camera Head devices are low activated – that is, solenoid and LEDs are activated when outputs go low rather than high.)

Notes



## **5. Diagnostic Testing Program Using An External Computer**

The ID-4 system software also includes a "TestRoutines" program for use with an external computer (PC, laptop, etc.). This permits activating individual components such as the Shutter, Aim Light, Face Strobe, etc. by keystroke, and monitoring the status of the sensors such as Strobe Ready, Camera Back position, etc.

To send commands and receive information from the computer, Test-Sense input J9 pin 3 must be grounded, causing U8-1 and U8-2 to switch to OFF. This instructs U1's program to jump to the test mode ("TestRoutines"), enabling TXD and RXD through J9-4 and J9-5 connected to the external computer. This diagnostic exercise feature with an external computer gives maximum testing flexibility of Camera functions.

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## **SECTION 3**

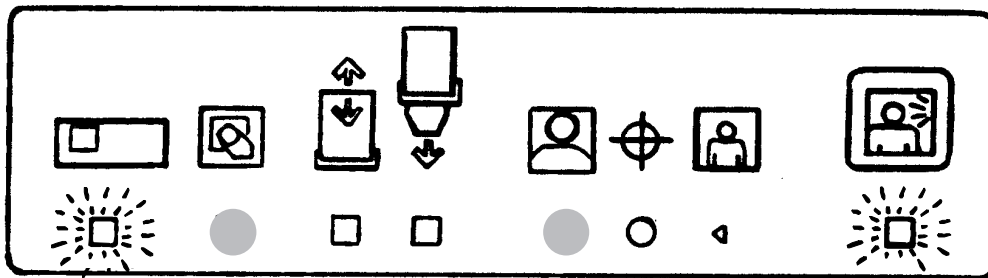
# **DIAGNOSTICS & TROUBLESHOOTING**



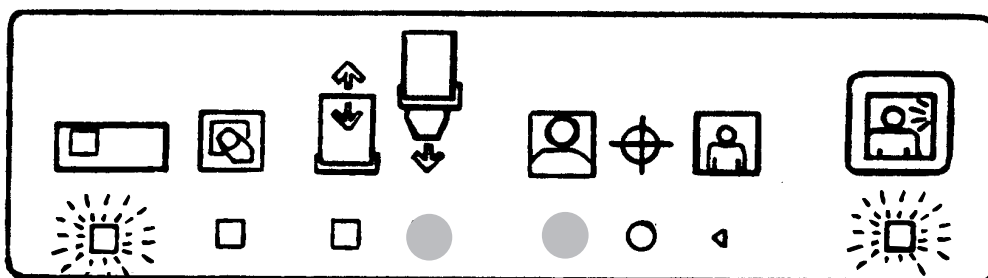
## Section 3 - Diagnostics & Troubleshooting

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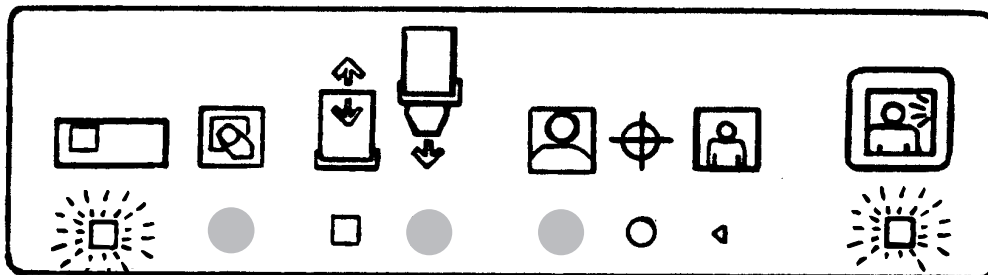
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B. Test Program Using External Computer	..... page 3-7
C. Troubleshooting Charts	
1. Sequence of Operation - Chart A	..... page 3-8
2. Sequence of Operation - Chart B	..... page 3-9
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4. Chart F	..... page 3-11
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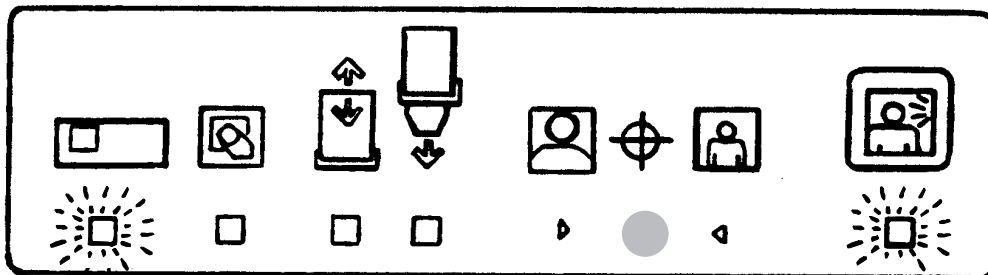
Face Did Not Charge



Face Did Not Flash



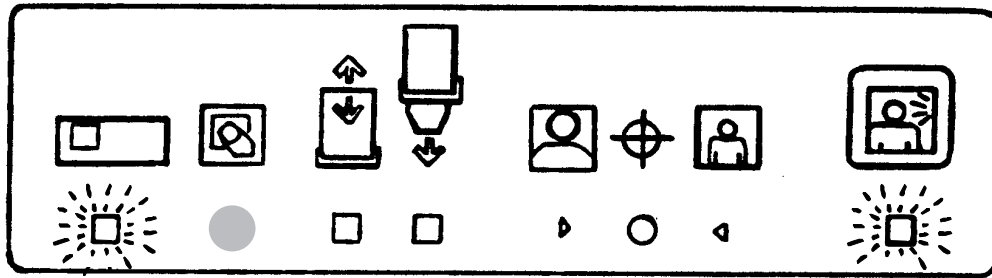
Mirror To Data Timeout



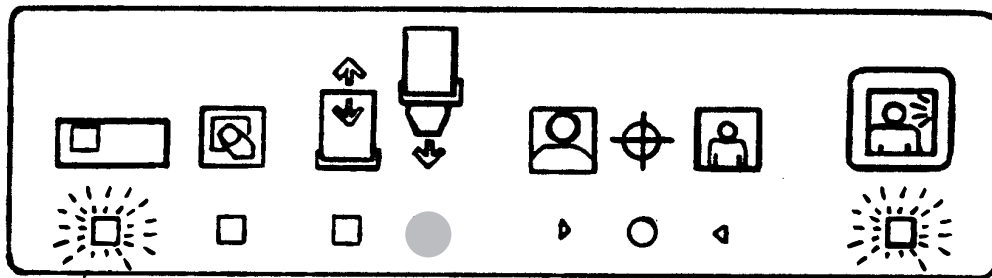
Mirror To Face Timeout

## A. Operator Panel Error Display Codes

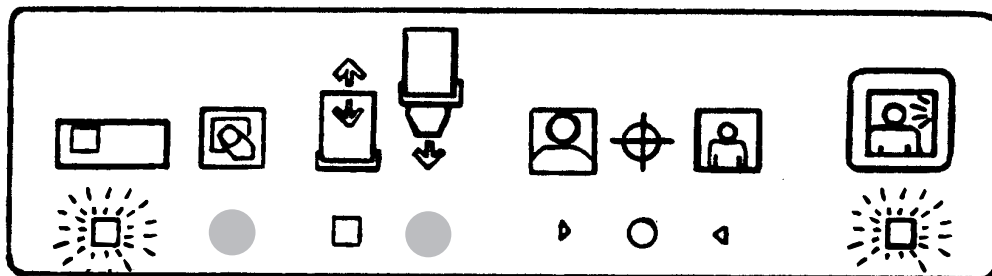
The Operator Display Panel (described in Section 2 – Part D) also functions as an indicator of eight specific System errors. When an error has occurred, the first and last LEDs will flash. Other LEDs will illuminate, as shown below and on the opposite page, identifying specific camera failures.



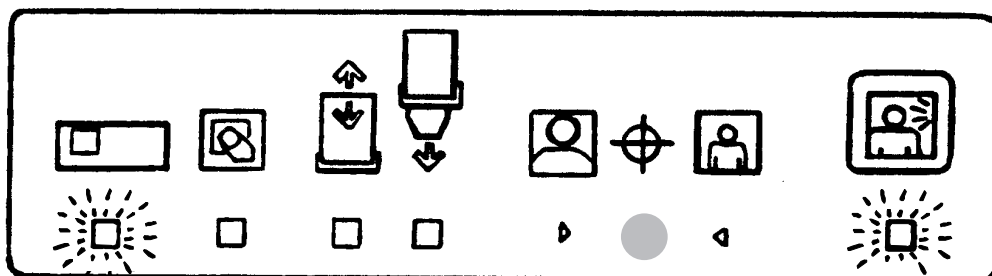
Data 1 Did Not Charge



Data 1 Did Not Flash



Data 2 Did Not Charge



Data 1 Did Not Flash

Notes



## **B. Test Program Using External Computer**

The ID-4 System includes a "TestRoutines" program for use with an external IBM compatible computer (PC, Laptop, etc.). This permits activating individual components such as the Shutter, Aim Light, Face Strobe, etc. by keystroke, and monitoring the status of the sensors such as Strobe Ready, Camera Back position, etc.

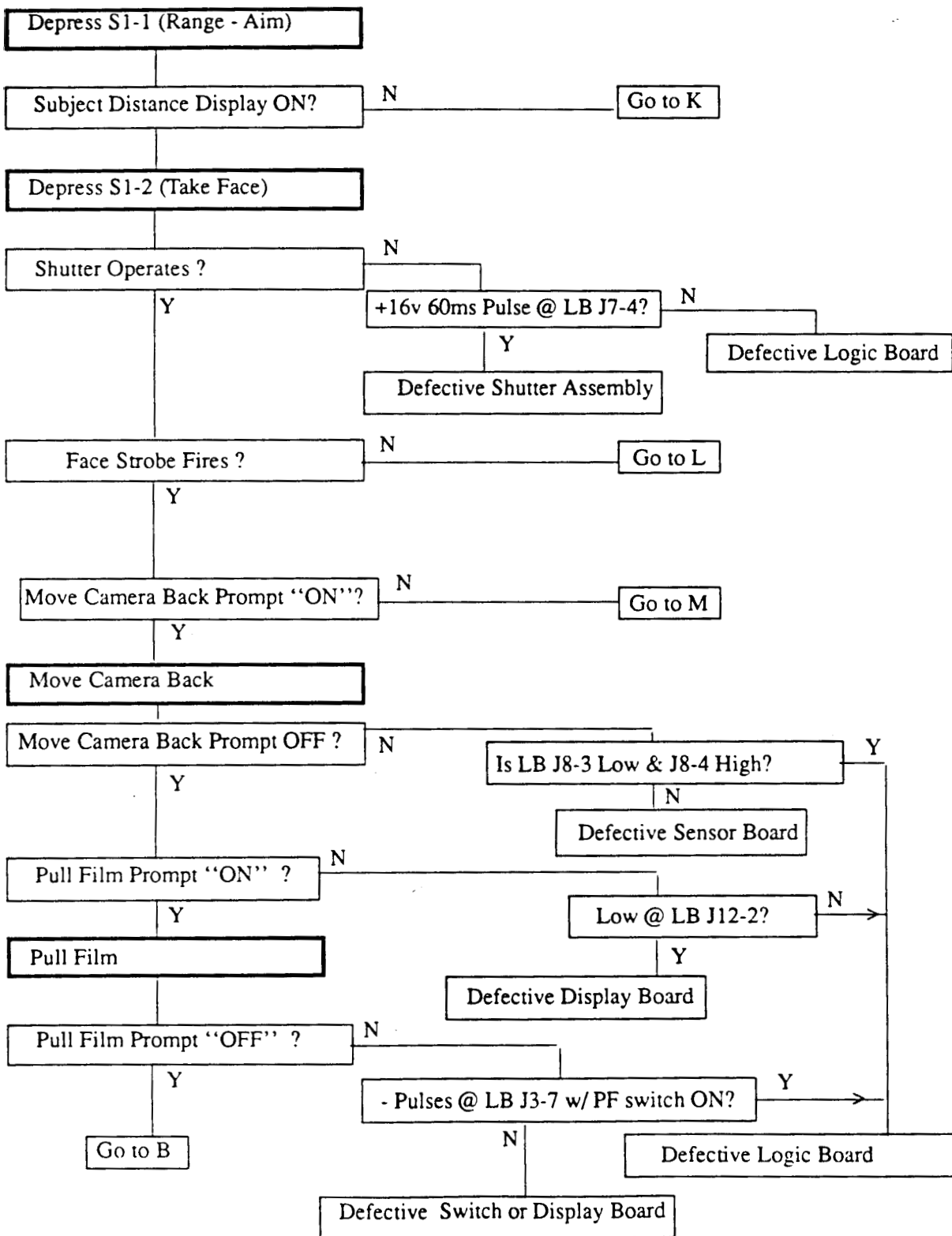
Connection of the computer to the camera is through the J9 connector on the Logic Board. The cable (P/N 13387) needed for this purpose is available from Material Services. The driver for "TestRoutines" is also available from Material Services (5 $\frac{1}{4}$ " floppy - P/N 13399)

**For further assistance, call Polaroid Technical Assistance:  
(800) 225-1618.**

# SEQUENCE OF OPERATION TROUBLESHOOTING

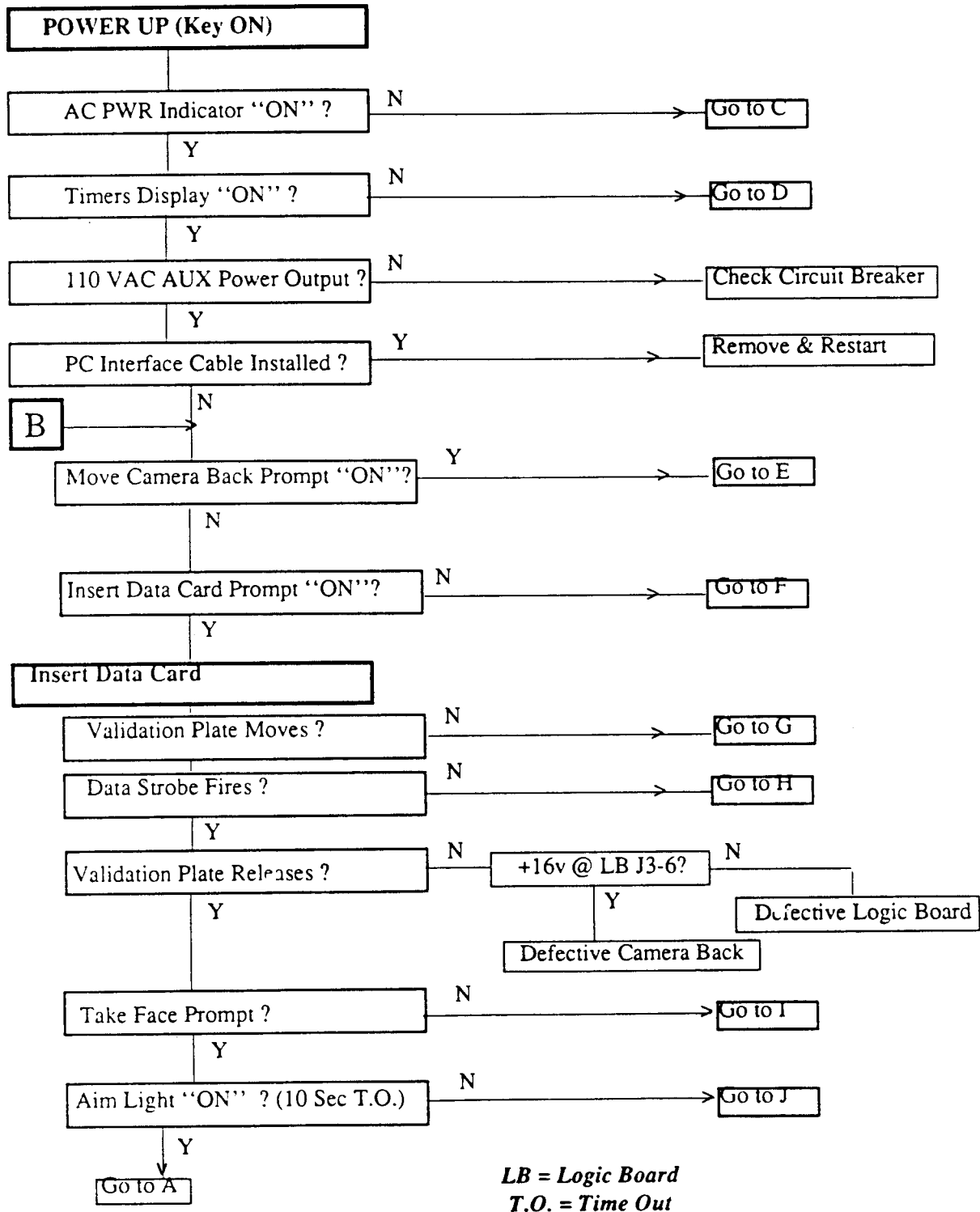
**A**

CHART A



PF SW = PULL FILM SWITCH

CHART B



CHARTS C, D, & E

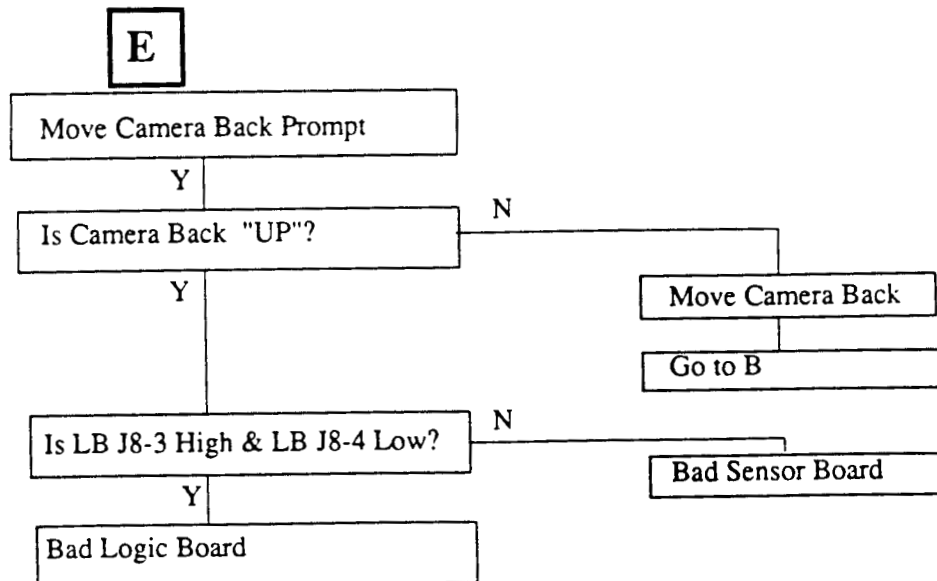
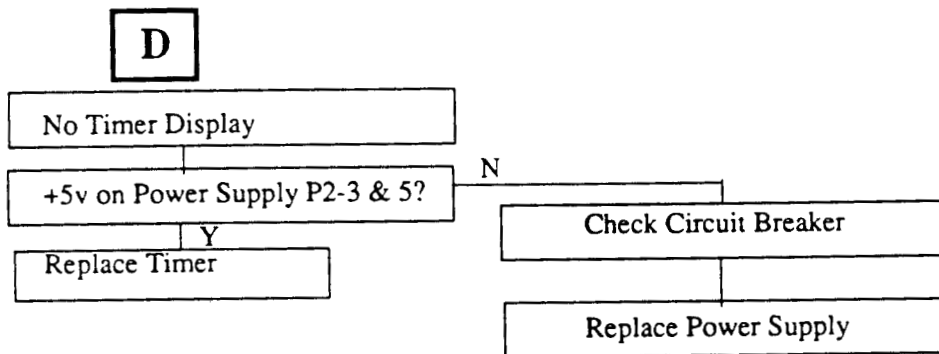
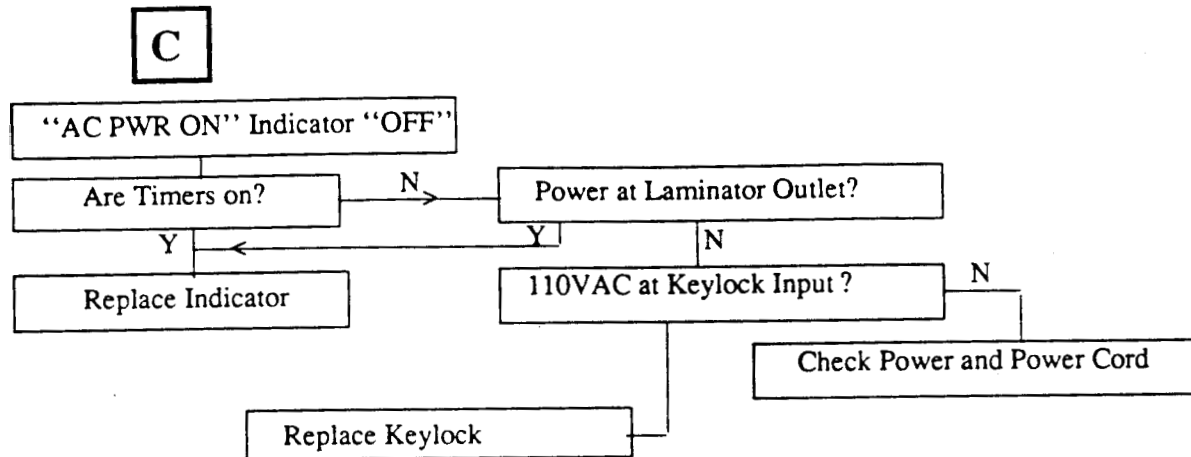
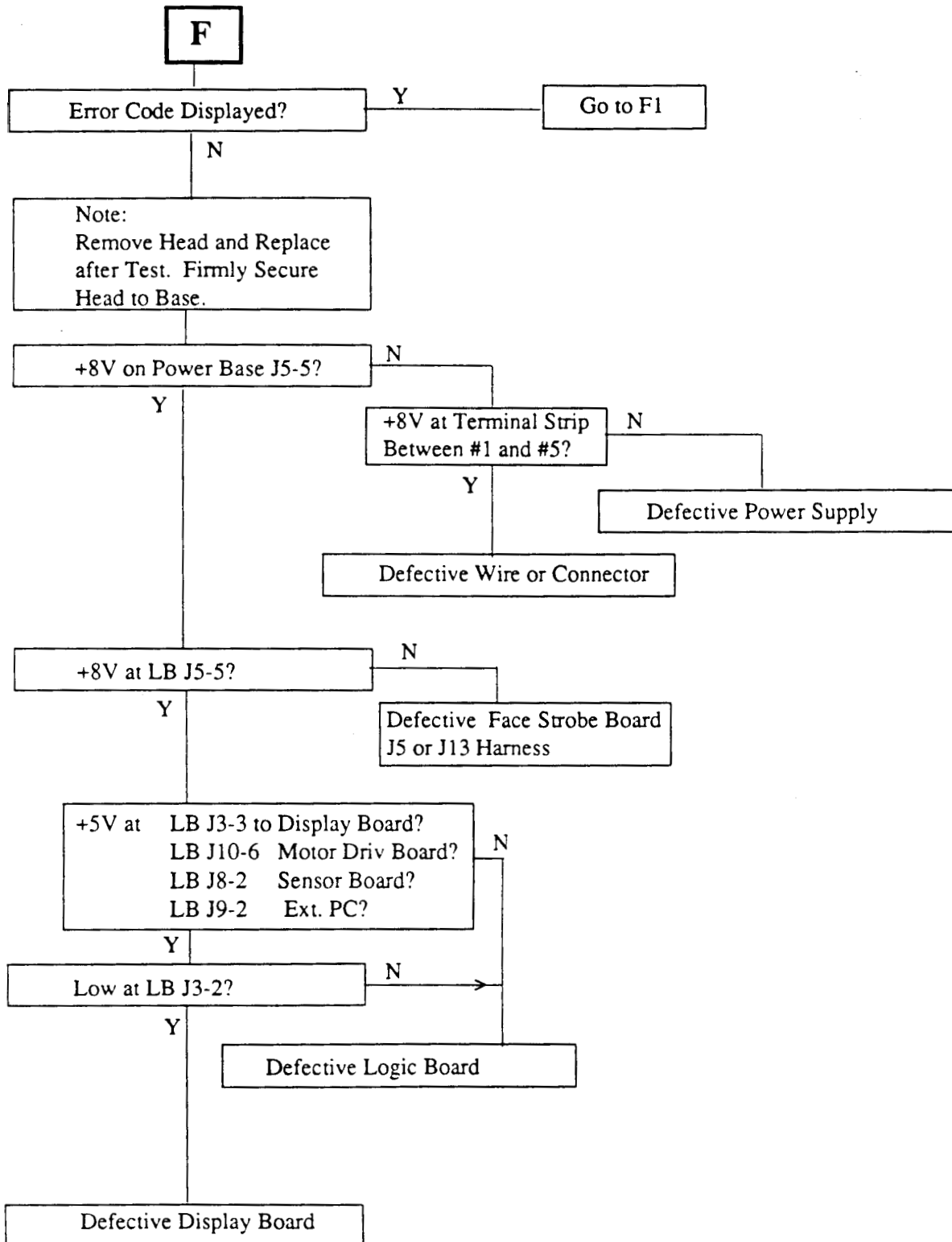
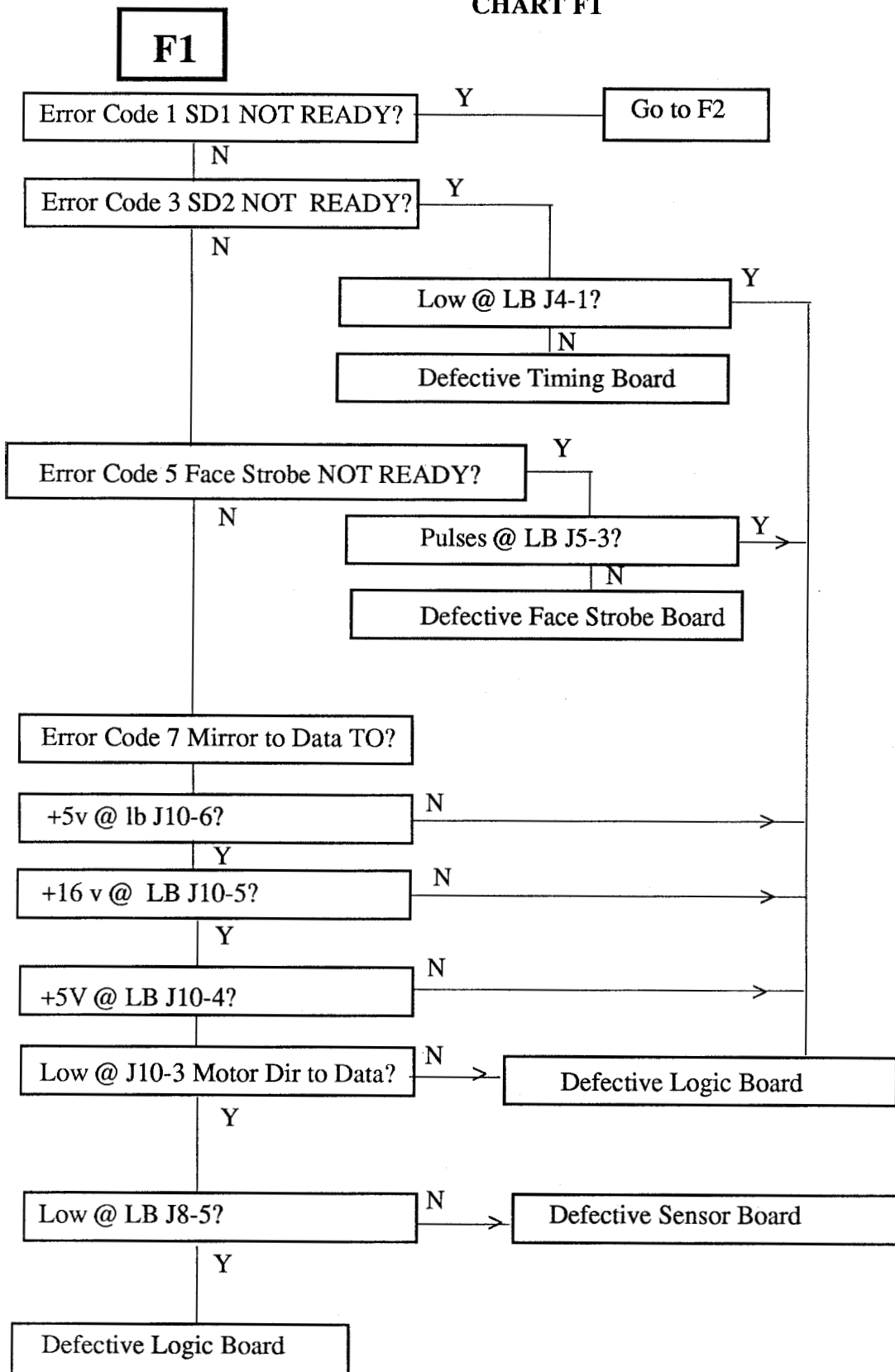


CHART F



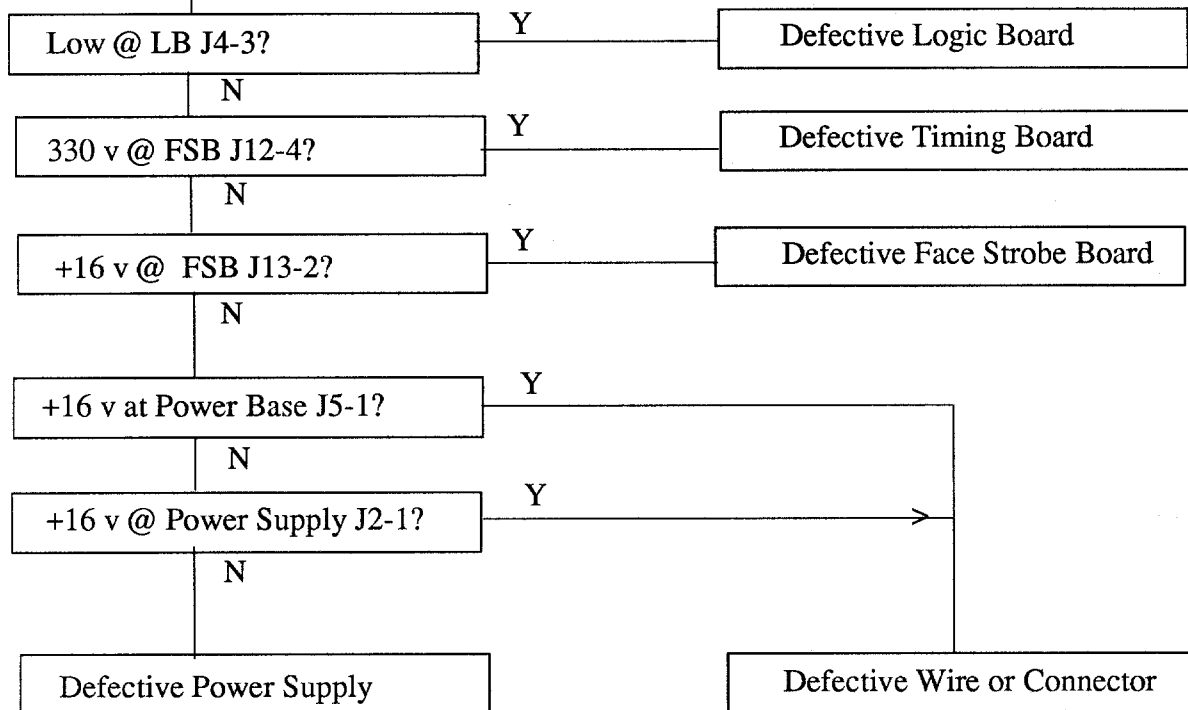
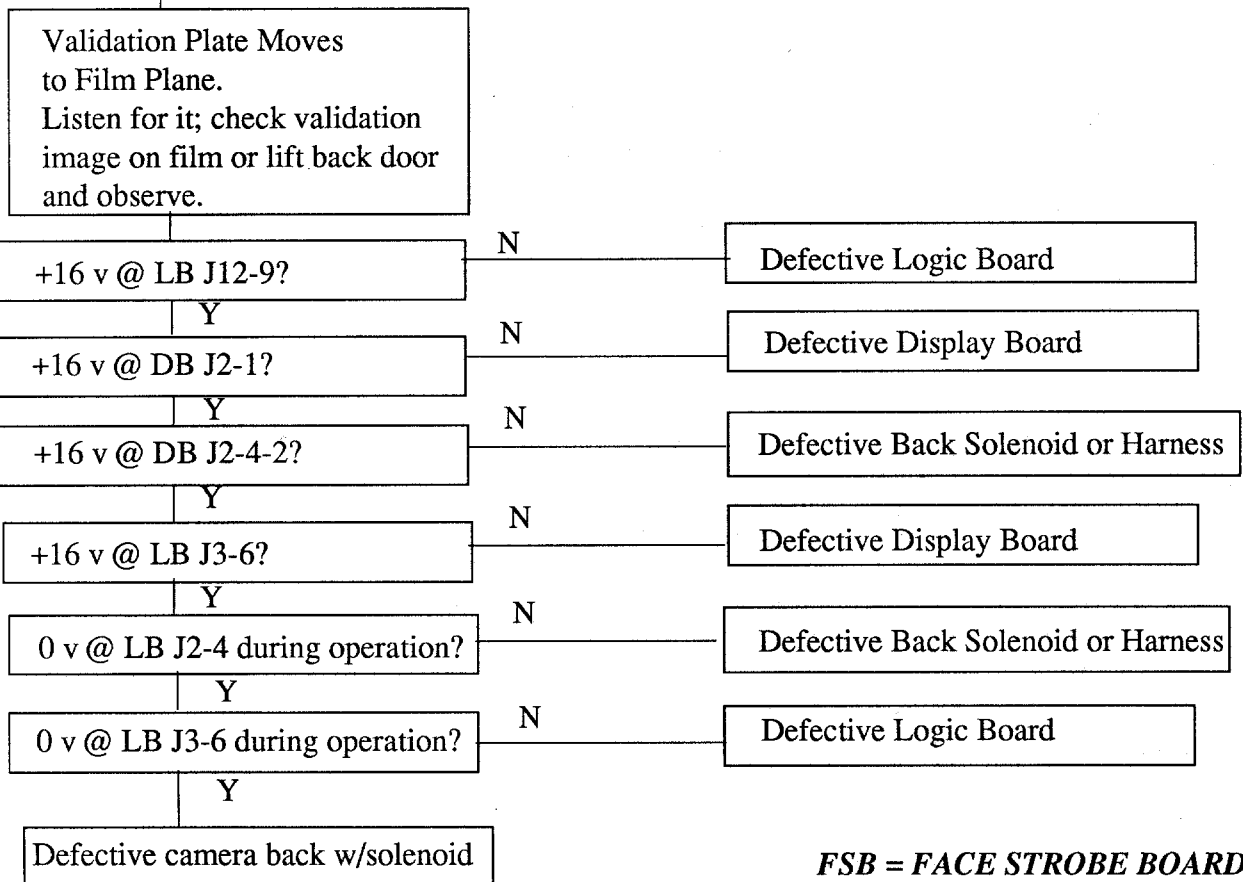
**LB = LOGIC BOARD**

CHART F1



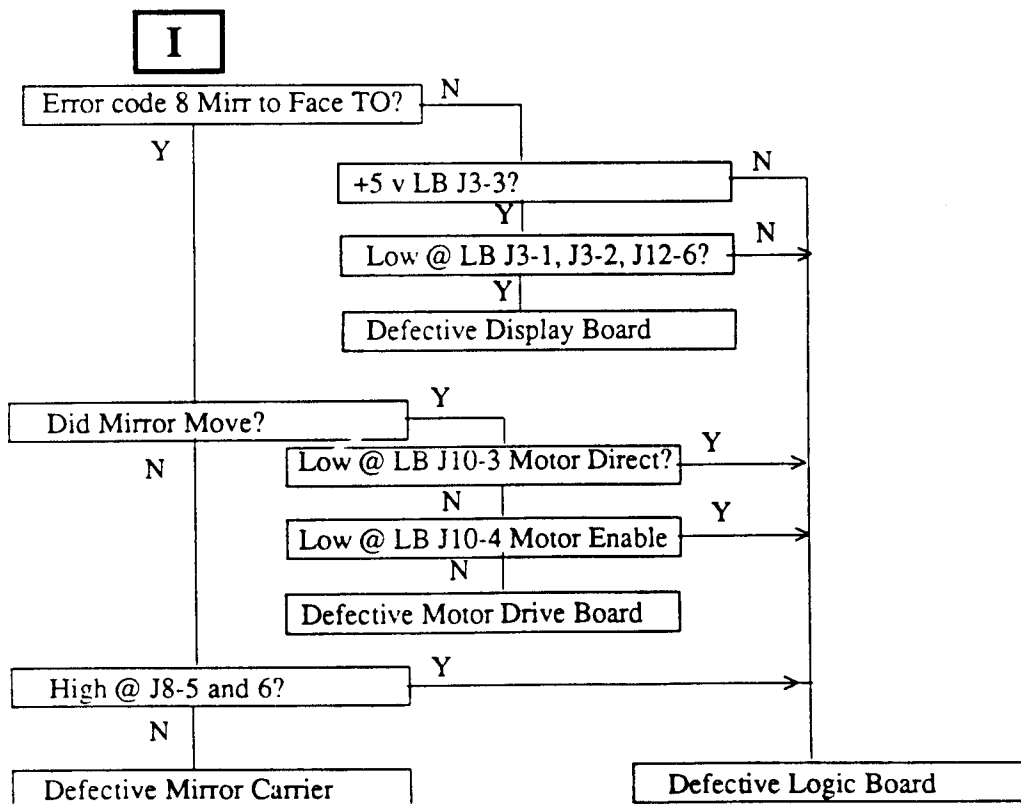
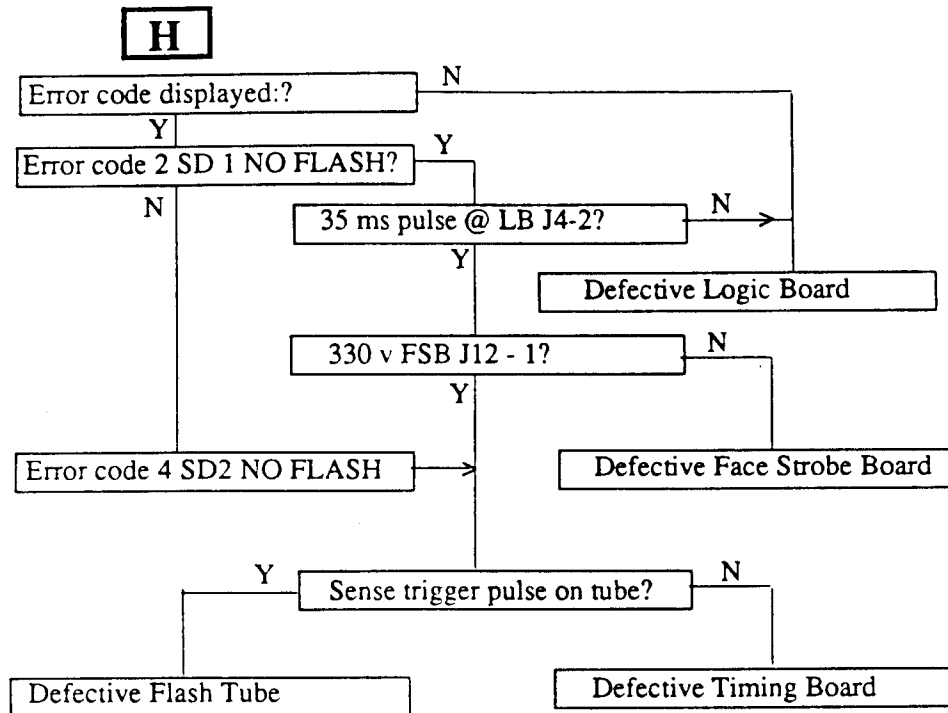
*SD1 = STROBE DATA 1*  
*SD2 = STROBE DATA 2*  
*DATA TO = DATA TIME OUT*  
*LB = LOGIC BOARD*

## CHARTS F2 &amp; G

**F 2****G**

**FSB = FACE STROBE BOARD**  
**SOL = SOLENOID**

# CHARTS H & I





## CHARTS J &amp; K

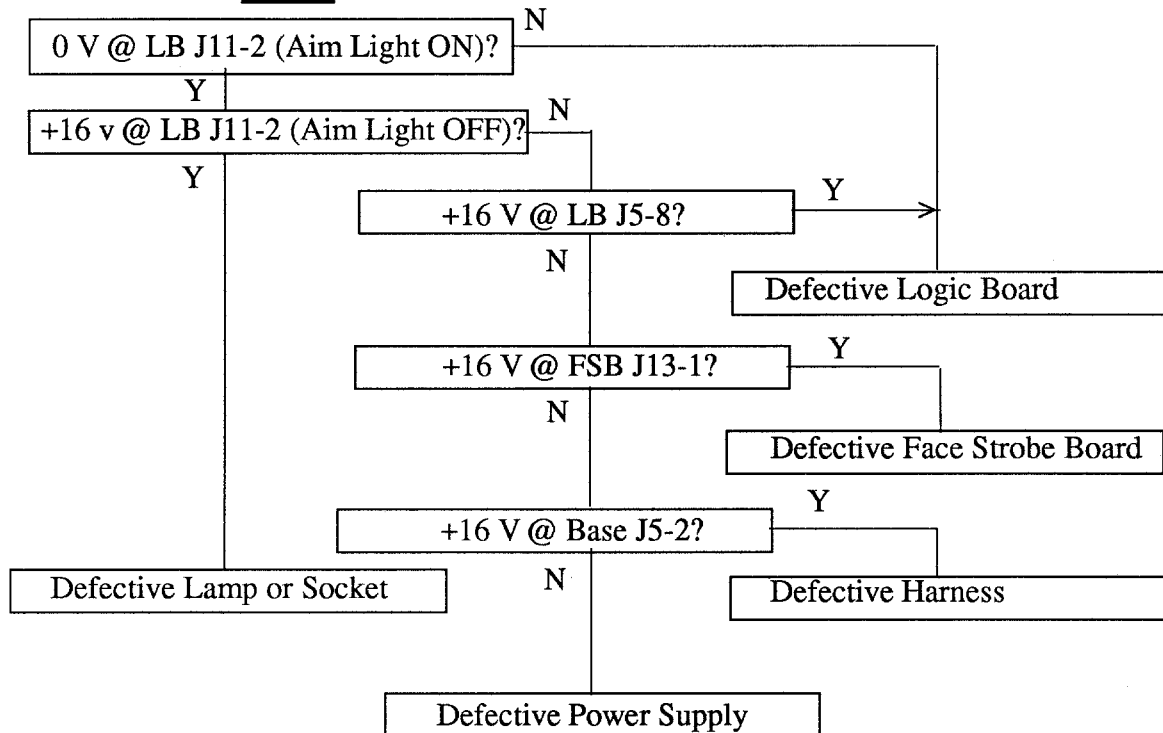
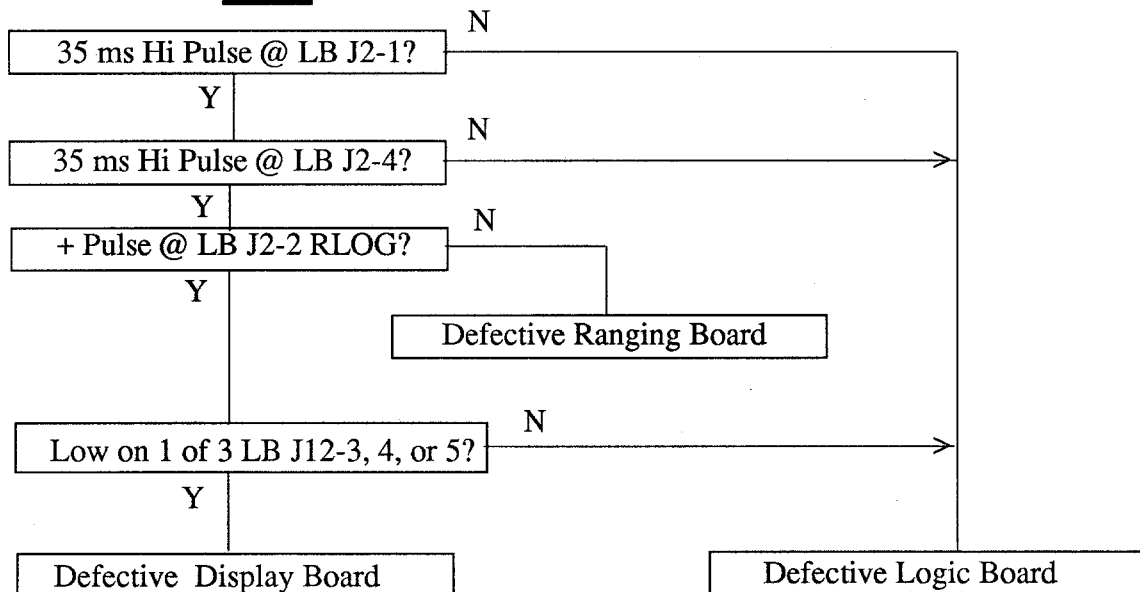
**J****K**

CHART L

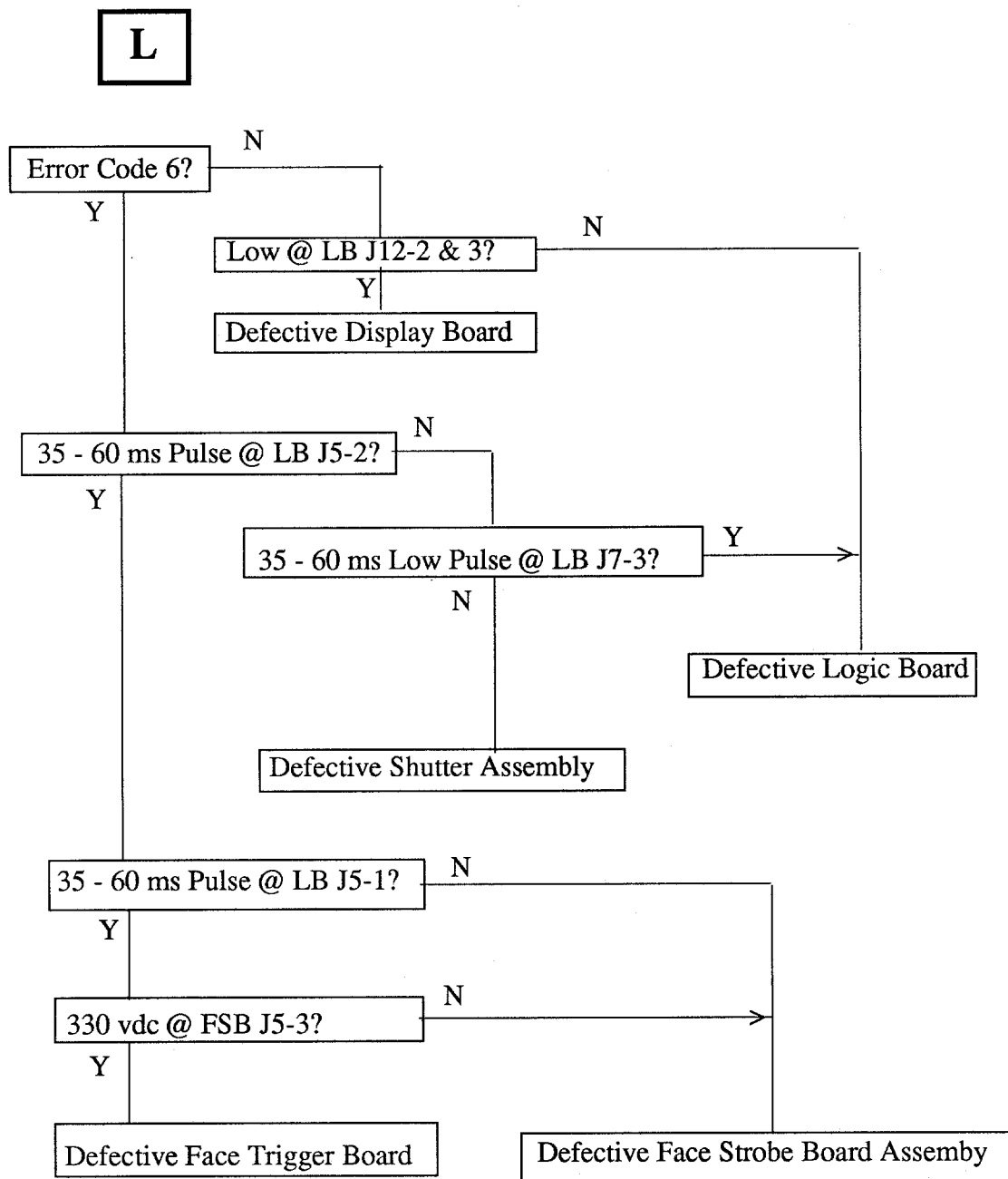
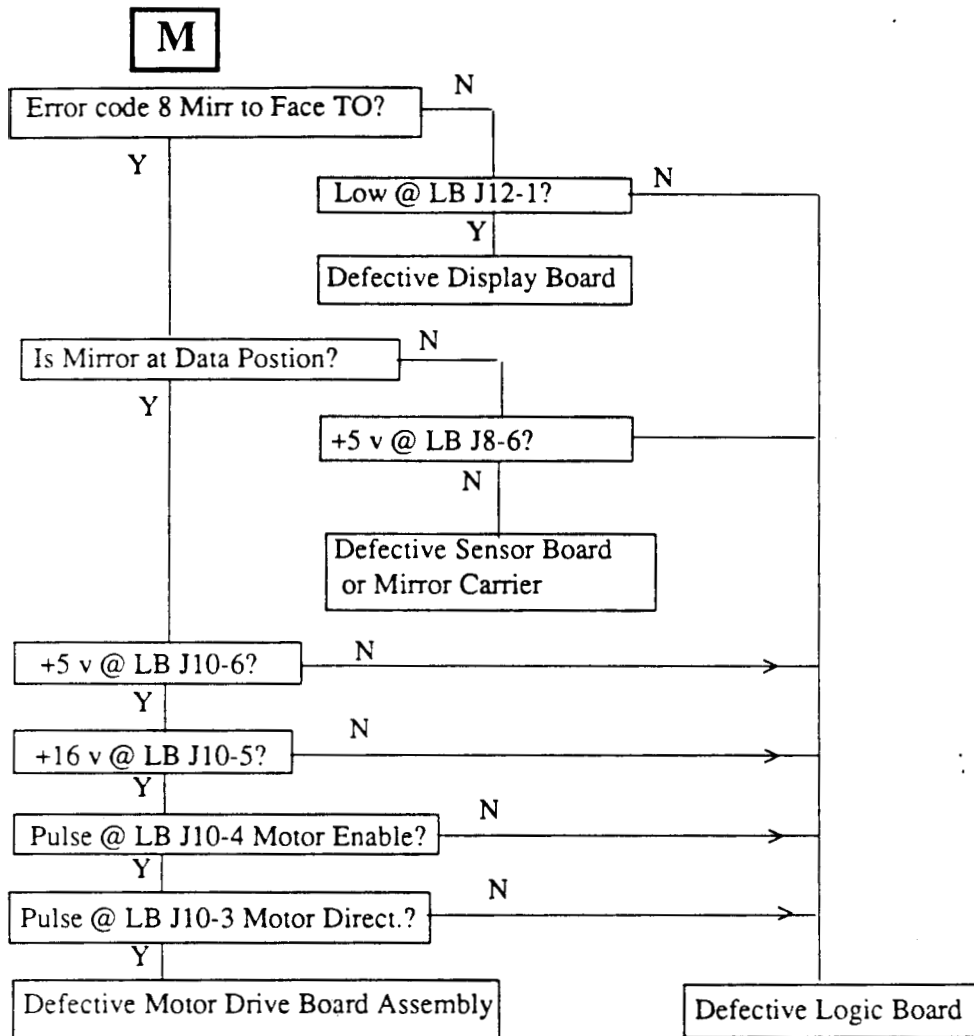


CHART M



**ERROR DISPLAY CODE:**

1 STROBE DATA 1 DIDN'T CHARGE	* + - - - *
2 STROBE DATA 1 DIDN'T FIRE	* - + - - *
3 STROBE DATA 2 DIDN'T CHARGE	* + + - - *
4 STROBE DATA 2 DIDN'T FIRE	* - - + - *
5 STROBE FACE DIDN'T CHARGE	* + - + - *
6 STROBE FACE DIDN'T FIRE	* - + + - *
7 MIRROR TO DATA TIMEOUT	* + + + - *
8 MIRROR TO FACE TIMEOUT	* - - - + *

\* = FLASHING

+ = ON

- = OFF

## D. Common Errors – Symptom & Analysis

**Note:** Always check for repair updates before performing alternative repairs.

<u>Symptom</u>	<u>Analysis</u>
• After first face flash the "pull film" light goes on.	<ul style="list-style-type: none"> <li>• Check for voltage doubler update.</li> <li>• Replace photosensor assembly (Camera Back).</li> <li>• Check Camera Back Alignment (Two-Up)</li> </ul>
• When face trigger button is depressed the mirror moves and "insert data card" light comes on. (No face fire/ranging light.)	<ul style="list-style-type: none"> <li>• Replace ranging board.</li> </ul>
• Data exposure uneven.	<ul style="list-style-type: none"> <li>• Replace data strobe tubes.</li> <li>• Replace data/timing board.</li> </ul>
• Error code flashes after first data is triggered.	<ul style="list-style-type: none"> <li>• Replace logic board.</li> </ul>
• Data not firing after card inserted. (Face trigger light comes on.)	<ul style="list-style-type: none"> <li>• Wrong version E-Prom.</li> <li>• Defective logic board.</li> </ul>
• Data not firing after camera is moved to position #2. ("Move film back" or "insert data card" light comes on.)	<ul style="list-style-type: none"> <li>• "Pull film" switch dirty/closed.</li> </ul>
• No data trigger.	<ul style="list-style-type: none"> <li>• Data card too narrow (missing sensor).</li> <li>• Photo sensor dirty or dislocated by inserting holder in upside-down.</li> </ul>
• False data trigger. (Double exposure.)	<ul style="list-style-type: none"> <li>• Operator error.</li> <li>• RF radio frequency interference (see update).</li> </ul>
• Delayed during power up. (Error code flashes.)	<ul style="list-style-type: none"> <li>• Replace power supply board.</li> </ul>
• Data not firing when card is inserted.	<ul style="list-style-type: none"> <li>• Data card too narrow (missing sensor).</li> <li>• Photo sensor dirty or dislocated by inserting holder upside-down.</li> </ul>
• Data not firing. ("Insert data card" and "move	<ul style="list-style-type: none"> <li>• Camera Back out of position.</li> </ul>

back" light comes on.)

### **Symptom**

### **Analysis**

• Intermittent black data. (Logic ignores problem.)

• Replace data/timing board.

• Data overexposed. (False triggering occurs when unit is turned off or while in operation.)

• Operator error.  
• RF radio frequency interference (see update).  
• Check for miswire on data/timing board.  
• Replace data/timing board.

Replace optosensor board in Camera Back.

• Delayed data fire (error code flashes) – very intermittent.

• No face strobe or shutter release when face button is pressed. (Error code flashes.)

• Shutter linkage/solenoid sticking in closed position. Replace solenoid.

• No face strobe fire (shutter operates but not counter advance). (Error code flashes.)

• Check shutter sync contacts.  
• Replace shutter.

• No face strobe fire. (When button is depressed the mirror moves and "insert data card" light comes on.) (No face fire/ranging light.)

• Replace ranging board.

• Delayed during power up. (Error code flashes.)

• Replace power supply board.

• Point light flickers/inoperable.

• Check for (U2) update on power supply board.  
• Replace logic board.

• Unit not ranging/no point lamp when face trigger button is depressed. (All other functions work during this malfunction.)

• Replace display board.

• Intermittent black data. (Logic ignores problem.)

• Replace data/timing board.

• Turning power switch to "off" position causes data strobe to fire. Result: data washout.

• Check for miswire at TC1, TC2, E1, E2, E3, or E4 on timing board.  
• Replace data/timing board.

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## **SECTION 4**

### **DISASSEMBLY, ADJUSTMENTS & WIRING**





## Section 4 - Disassembly, Adjustments & Wiring

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Notes

## **A. Service Access Parts Finder**

In this manual and in the accompanying videotape, the main components of the ID-4 are grouped in three levels as follows:

Level 1 - Parts or Assemblies which may be accessed after the removal of the Front Cover.

Level 2 - Parts or Assemblies which require the removal of both the Front and Back Covers.

Level 3 - Parts or Assemblies which require the removal of both Covers and the separation of the Main Frame from the Baseblock.

**Each of the 30 primary ID-4 Parts and Assemblies are listed on page 4-7 along with its Level and page reference for this manual.**

Notes

<b>Part or Assembly</b>	<b>Level</b>	<b>Page</b>
Aim Light Assembly	1	4-21
Back Cover	1	4-19
Back Plate Assembly	2	4-33
Base Slide Spacer Assembly	2	4-35
Camera Back Assembly	*	
Camera Back Stop	2	4-35
Counter	2	4-31
Data Card Sensor Cable Assembly	1	4-29
Data Flashtubes	3	4-53
Data Strobe Board	2	4-39
Display Board	2	4-33
Face Brightener Solenoid Assembly	1	4-25
Face Polarizer	*	
Face Strobe Board	2	4-39
Face Strobe Reflector Assembly	1	4-21
Flash Channels	3	4-55
Front Window (top of front cover)	1	4-17
Horizontal Reflectors	3	4-55
Latch Mechanism	2	4-35
Logic Board	2	4-37
Lower Mirror	2	4-45
Mirror Carrier	2	4-43
Parallel Reflectors	3	4-55
Photo Sensors	2	4-47
S1 Switch Assembly	2	4-33
Shutter Assembly	2	4-51
Shutter Solenoid Assembly	1	4-29
Transducer & Ranging Board	1	4-27
Upper Mirror	2	4-41
Validation Plate Solenoid	2	4-35

\* These items may accessed directly.

Notes

## **B. Cautions, Reminders & Tools**

### **1. Cautions & Reminders**

- 1.1. Check Strobe capacitors with VOM for presence of DC voltage, before working on Boards.
- 1.2. Do not fire Data Strobes with flashtubes disconnected — this can damage circuit.
- 1.3. Do not touch glass surface of flashtubes with fingers.
- 1.4. When installing the front cover, hold Aim Light Blinders apart with fingers or soldering aid to prevent scratching Aim Light Lens.
- 1.5. Do not pull on wires to disconnect cables: lift connectors off board.
- 1.6. Keep track of screw types and sizes for particular part being disassembled. (See ID-4 Parts Catalog for details.) On re-assembly, do not overtighten.
- 1.7. When replacing Front or Back Covers, be sure no wires are caught and compressed between mating parts.

Notes



## **2. Tools Recommended for Disassembly & Reassembly**

Extension Cable - P/N 13386  
Shutter Removal Tool - P/N 11523  
Grip Clip Removal Tool - P/N 13383  
Face Polarizer Installation Tool - P/N 11522  
Lens Resolution Target - P/N 11520  
Test Validation Plate - P/N 11535  
Soldering Aid - P/N 94116B  
Rivet Fixture - P/N 13433  
Rivet Installer - P/N 13440  
Rivet Remover - P/N 13439  
Interface Cable - P/N 13387  
IBM Diag S/W - P/N 13399  
Contact Crimping Tool - P/N 13511

Slotted head screwdriver  
Phillips head screwdrivers (#0, 1 & 2)  
Small nut driver set  
3/32" ball-end Allen wrench (for Aim Light)  
Needle nose pliers, straight & curved nose  
Small wire cutters  
Shim stock 0.025" for Shutter linkage adjustment  
Volt-Ohm meter  
Logic Probe

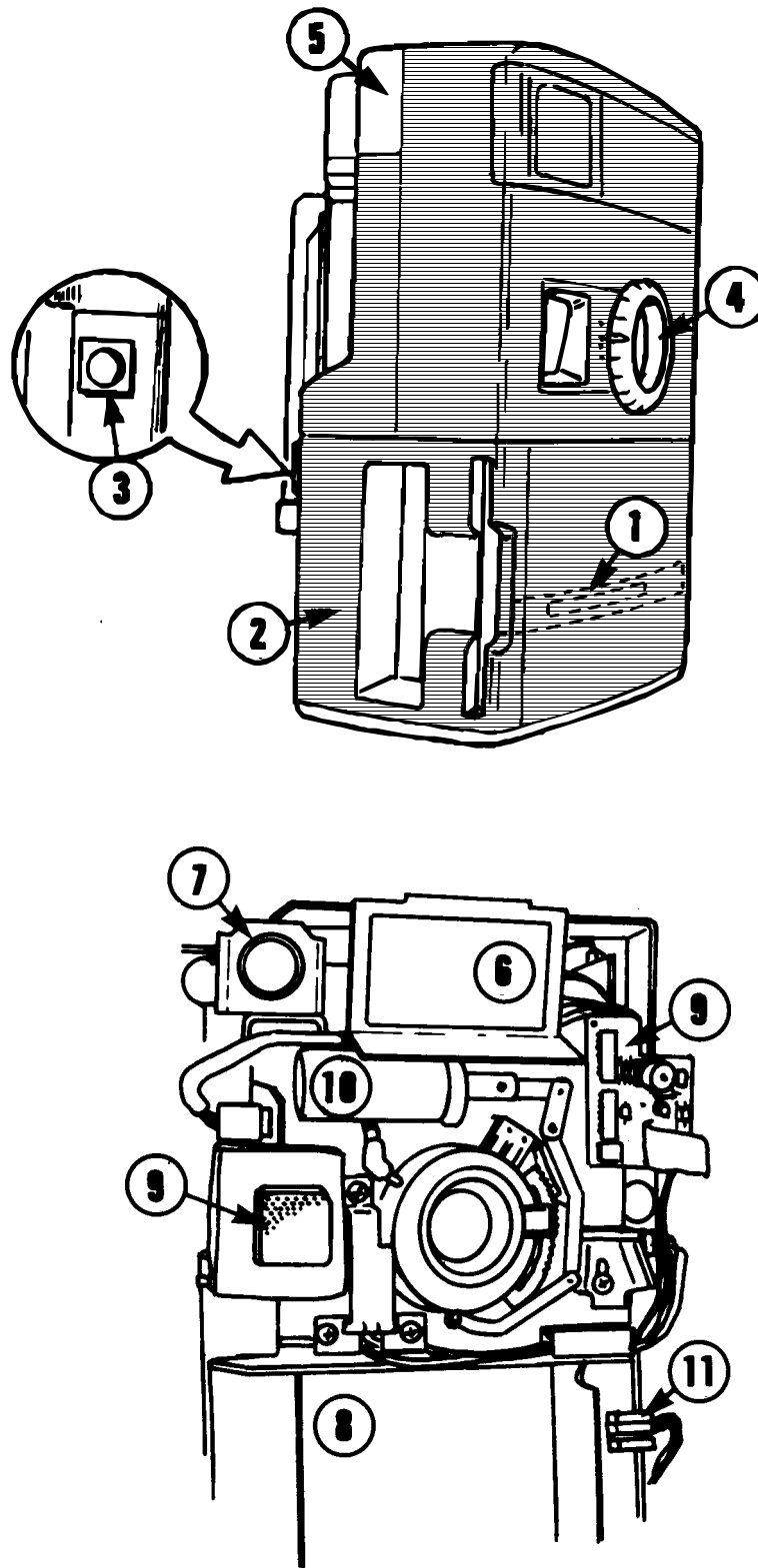


Figure 4-1 Removing Front Cover

## **C. Level 1 Parts Removal**

This section first describes the removal of the Front Cover and the following group of associated parts (Fig. 4-1, top):

1. Grip Clip (inside Front Cover)
2. Hand Grips
3. S1 Button
4. Shutter Bezel
5. Aim Light Cover

The next section next covers the removal of the following parts which are accessible after the removal of the Front Cover (Fig. 4-1, bottom):

6. Face Strobe Reflector Assembly
7. Aim Light Assembly
8. Face Brightener Solenoid Assembly
9. Transducer and Ranging Board
10. Shutter Solenoid Assembly
11. Data Card Sensor Cable Assembly

**Note:** Before attempting any parts removal, lift the Camera Head off the base and place on a suitable work area.

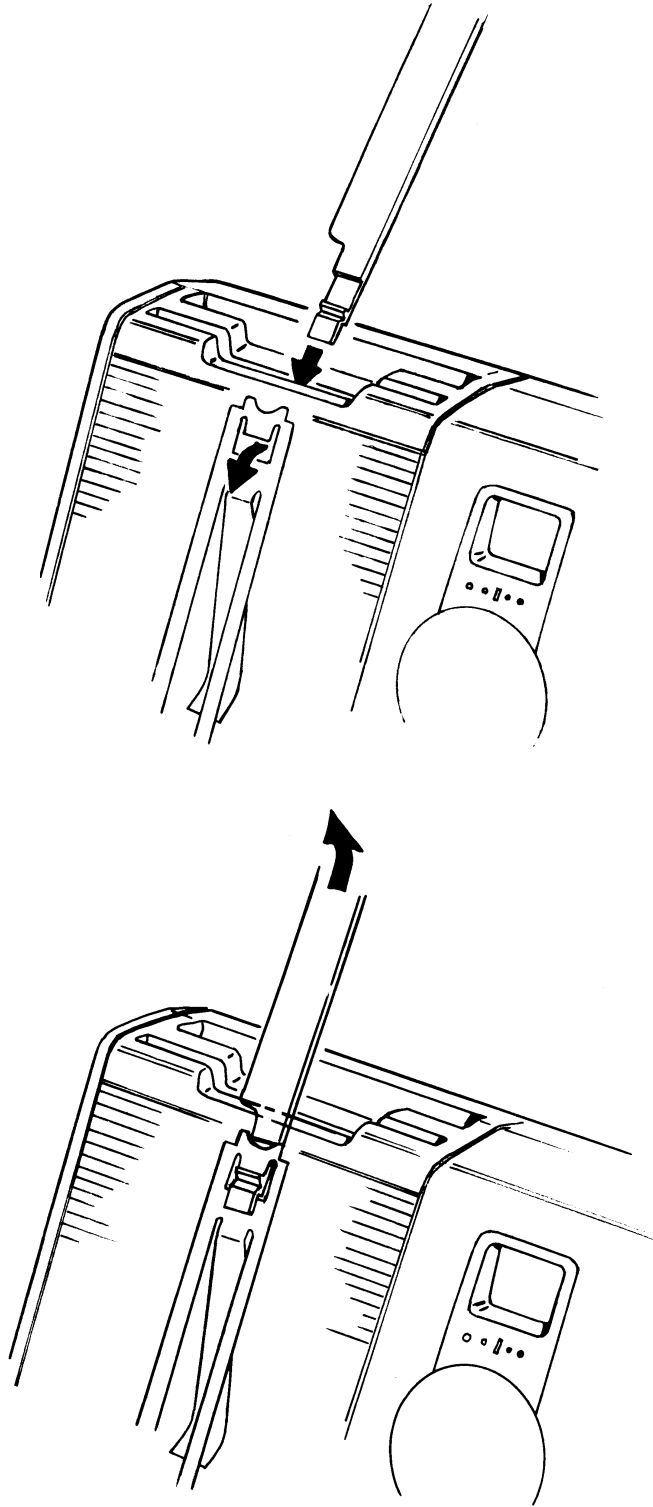


Figure 4-2 Removing Grip Clip

**1. Front Cover**

**1.1 Remove Data Card Holder.**

**1.2 Remove the Grip Clip.**

Hold Camera firmly on side with Data Card Holder opening up. Insert Grip Clip Removal Tool through opening and into the end of Grip Clip. (Fig. 4-2, top) Push downward on Tool and at same time rotate toward the front of Camera to release Grip Clip. (Fig. 4-2, bottom)

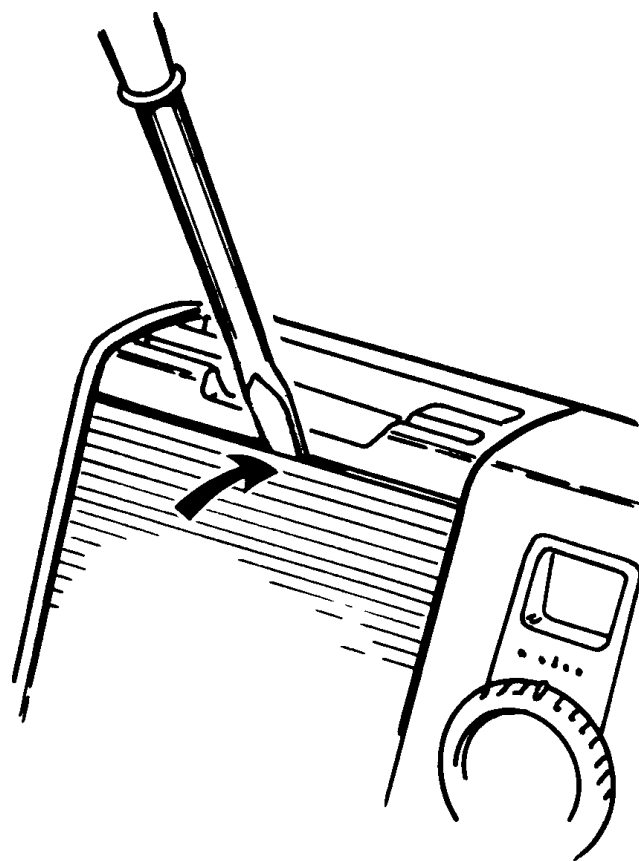


Figure 4-3 Removing Hand Grips

- 1.3    **Remove Hand Grips.**  
Use a screwdriver to press down on the cover clips to release the plastic tips from the front cover (Fig. 4-3). Rotate Grip backward to remove.
- 1.4    **Remove the blue S1 button.**
- 1.5    **Remove shutter bezel by pulling straight out.**
- 1.6    **Remove Aim Light Cover by pushing in the side on top and sliding off.**
- 1.7    **Loosen (do not remove) two screws on Base Plate nearest connector. (Fig. 4-4)**
- 1.8    **Remove two recessed screws at top of Back Cover. (Fig. 4-5)**
- 1.9    **Remove front cover.**

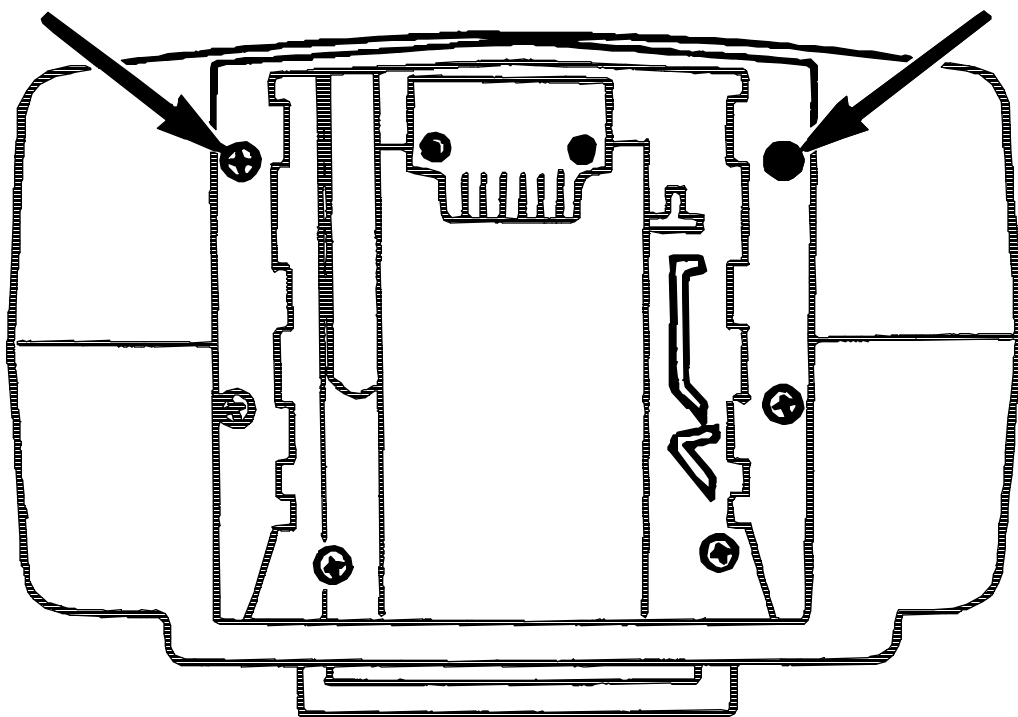


Figure 4-4 Loosening Base Plate



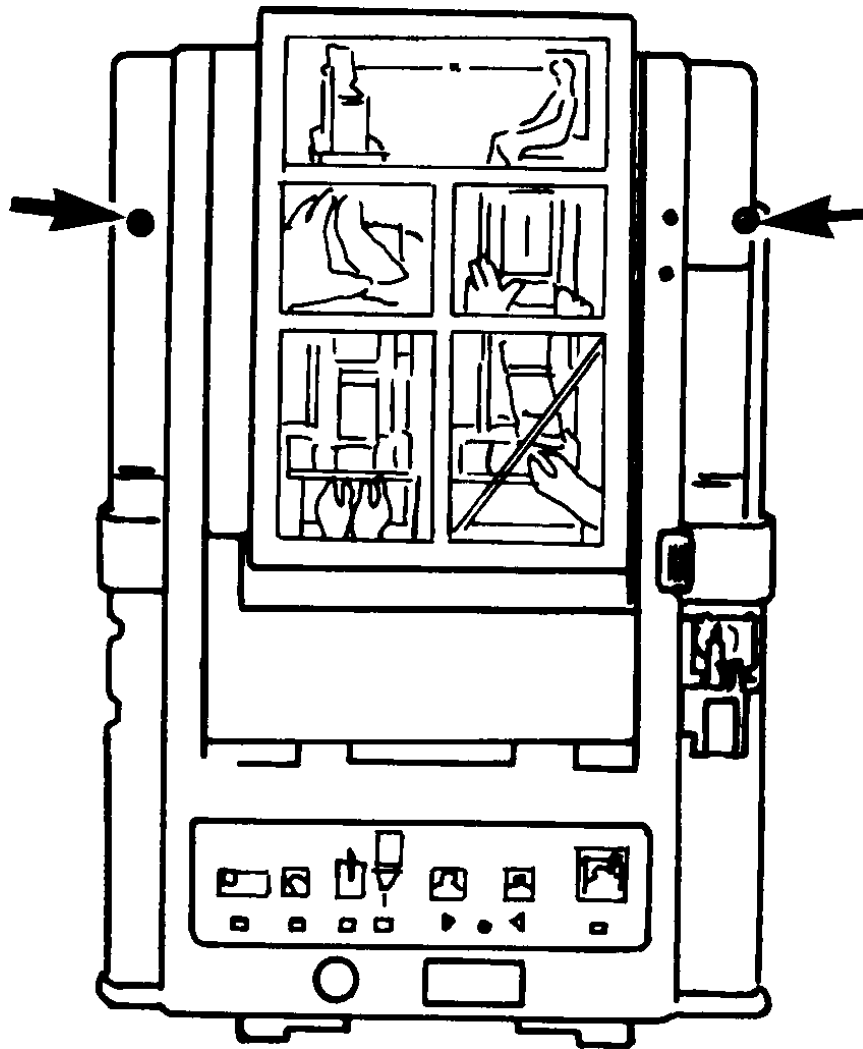


Figure 4-5 Back Cover Screw Removal

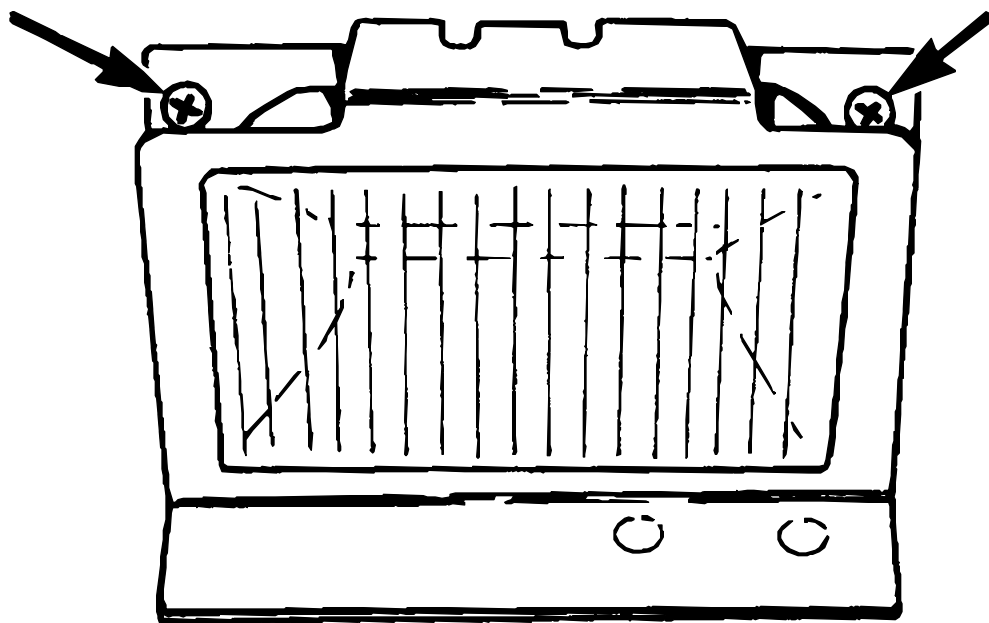


Figure 4-6 Loosening Face Strobe Screws

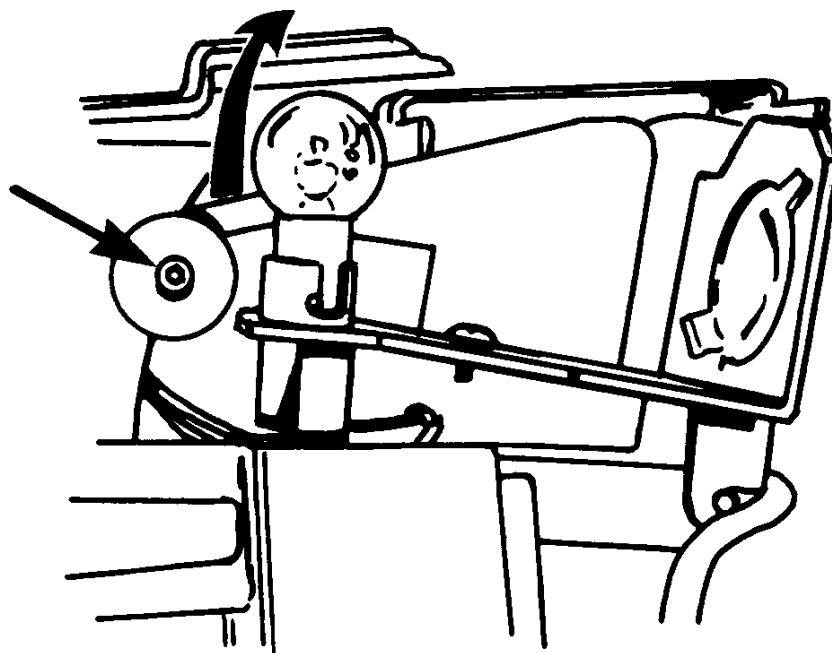


Figure 4-7 Vertical Adjustment Screw

## **2. Face Strobe Reflector Assembly**

- 2.1 Slide out insulating paper on aimlight side of strobe.
- 2.2 Loosen two screws at top of bracket. (Fig. 4-6)
- 2.3 Unplug connector—slide Assembly up and out.

## **3. Aim Light Assembly**

- 3.1 Disconnect plug from J11 on Logic Board.
- 3.2 Loosen (do not remove) Vertical Adjustment Screw shown with 3/32" ball-end Allen wrench. (Fig. 4-7)
- 3.3 Pivot Assembly straight up and lift off.  
(See Figs. 4-8 & 4-9)

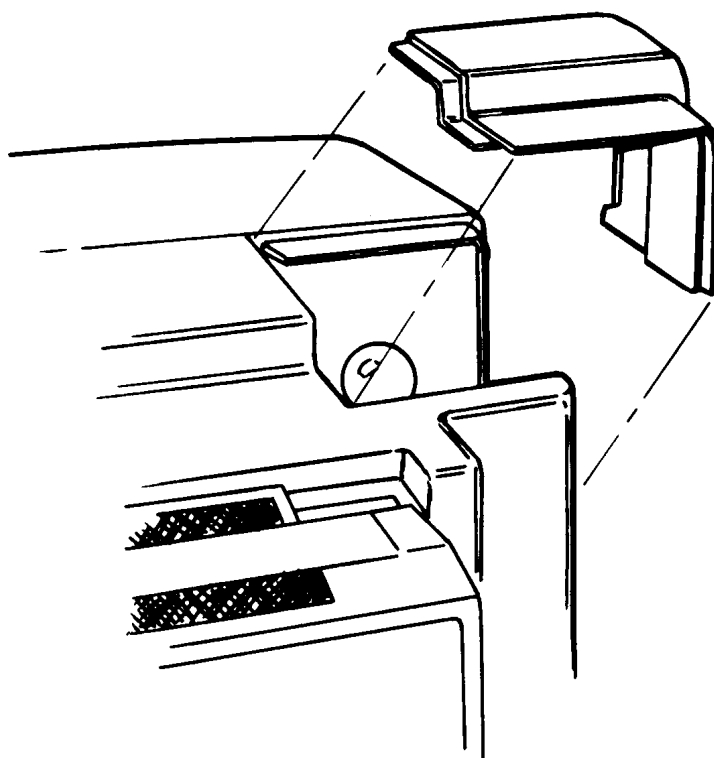


Figure 4-8 Removing Aim Light Door

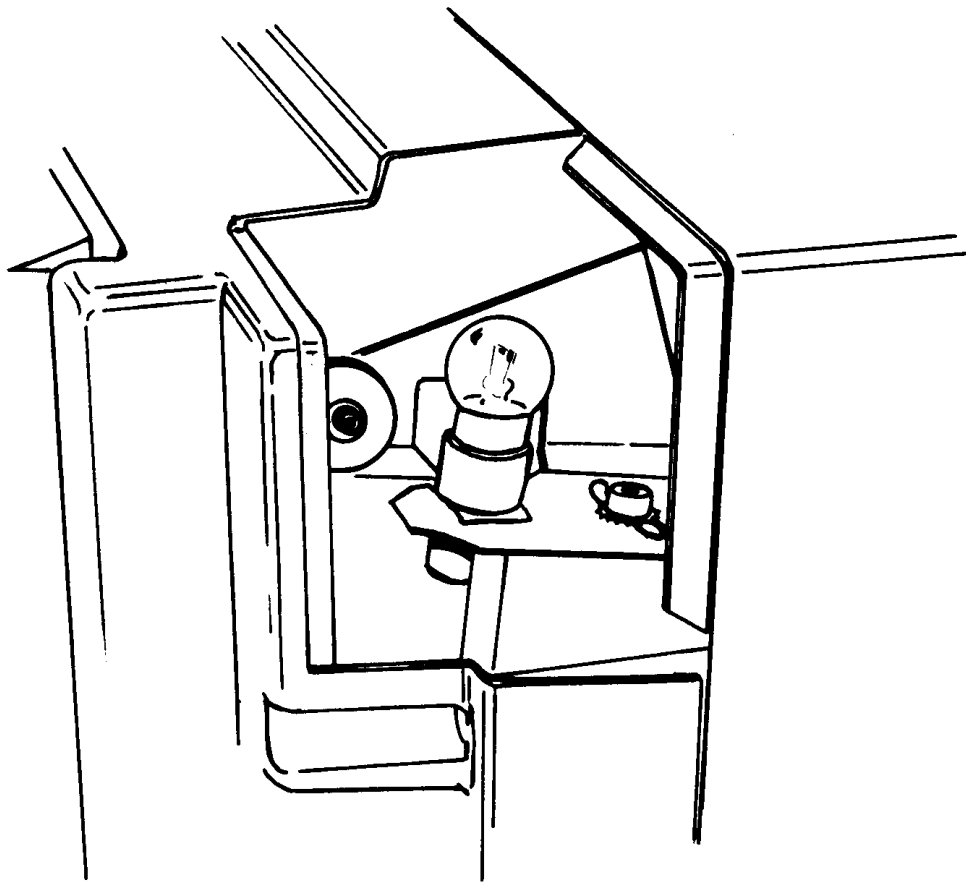


Figure 4-9 Aim Light Assembly

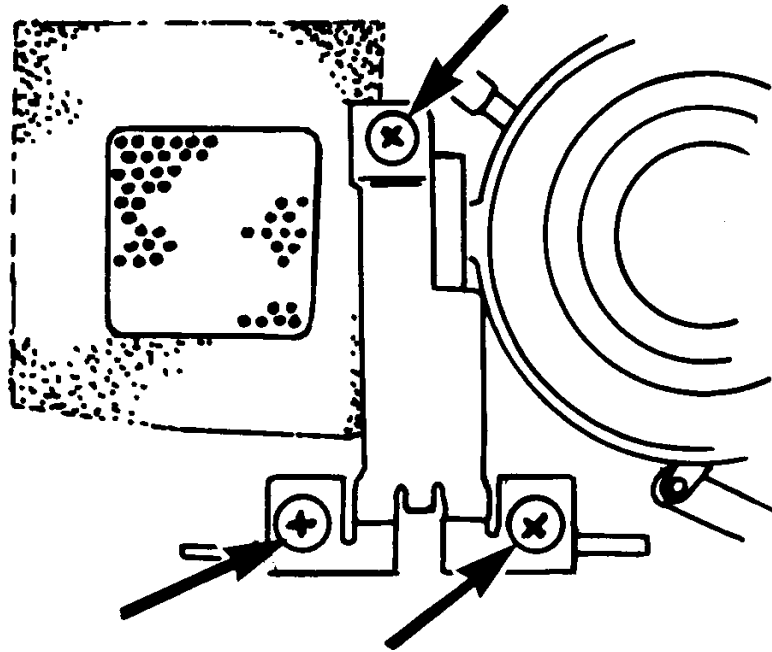


Figure 4-10 Removing Bracket Screws

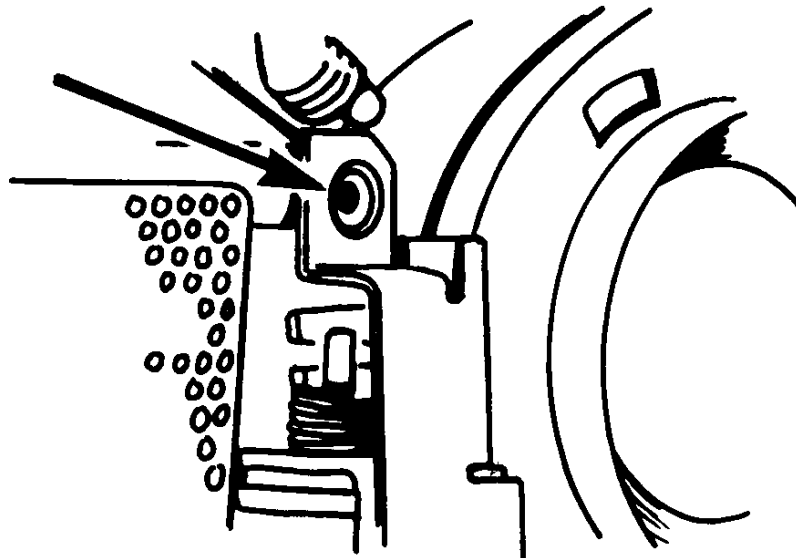


Figure 4-11 Seating of Top

#### **4. Face Brightener Solenoid Assembly**

4.1 Remove three screws from bracket. (Fig. 4-10)

4.2 Disengage bracket from arm.

4.3 Remove Solenoid, spring and plunger.

4.4 Unplug Solenoid cable from J1 on Logic Board

Note: When remounting bracket, seat top fully down on top post shoulder. (Fig. 4-11)

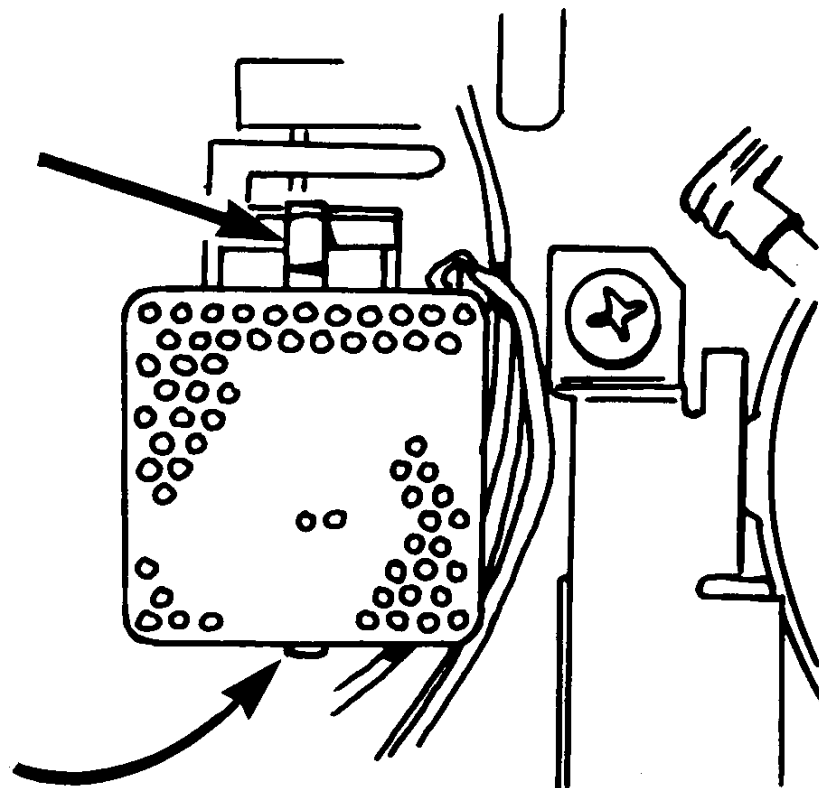


Figure 4-12 Unlocking Transducer Tabs



## **5. Transducer & Ranging Board**

5.1 Peel off foam gasket around Transducer.

5.2 Unlock tabs at top and bottom of Transducer.  
(Fig. 4-12)

Note: 1/2" x 1/8" x .010" shims are used under the top or bottom of the Transducer to tilt it for upper or lower CR 80/79 formats. Other formats do not require shims.

5.3 Unplug flex cable from J2 on Logic Board.

5.4 Remove screw holding Ranging Board.

5.5 Slide wire leads off Transducer terminals.

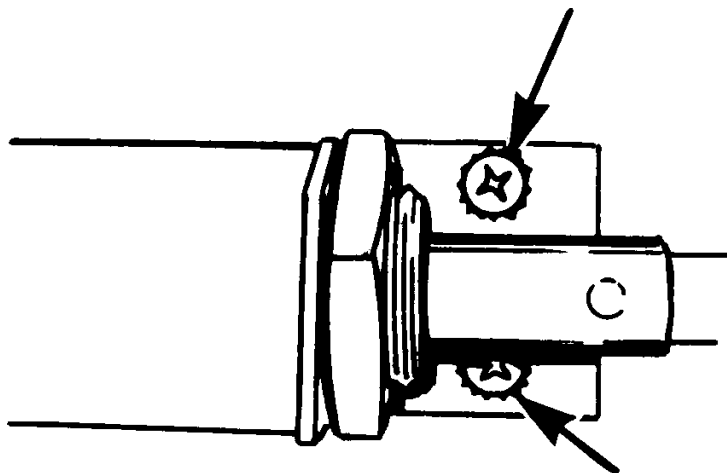


Figure 4-13 Disconnecting Solenoid

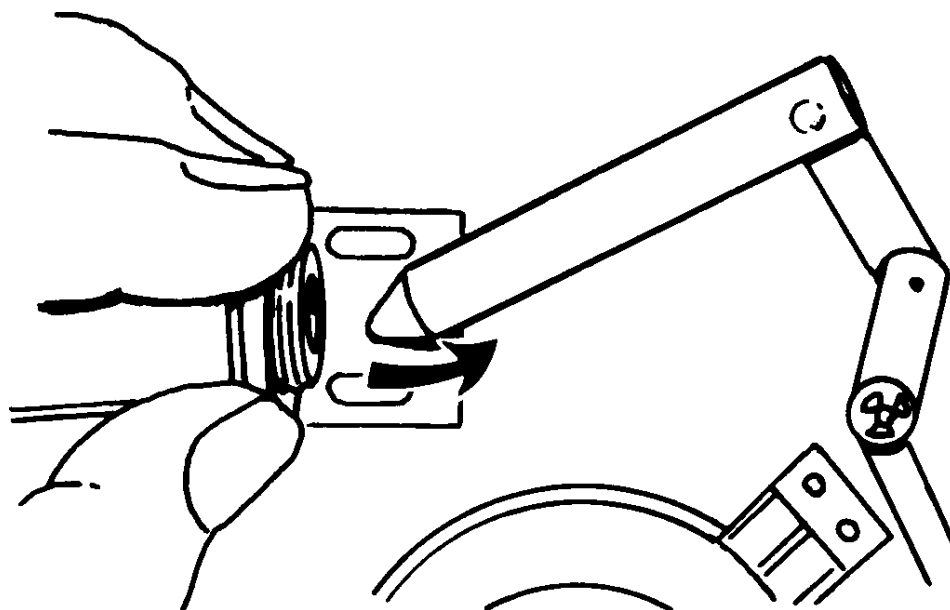


Figure 4-14 Sliding Solenoid Body Off Cover

## **6. Shutter Solenoid Assembly**

- 6.1 Disconnect Solenoid cable from J7 on Logic Board. (Fig. 4-13)
- 6.2 Remove two screws holding bracket to Base Block.
- 6.3 Slide Solenoid body off plunger ("d"). (Fig. 4-14)

Note: When reinstalling Shutter Solenoid Assembly, perform the "Setting the Shutter Linkage" procedure described later under "Adjustment Procedures."

## **7. Data Card Sensor Cable Assembly**

- 7.1 Unplug connector J6 from Logic Board.
- 7.2 Release locking tab on bottom of Sensor (next to orange and red wires) and slide connector out.

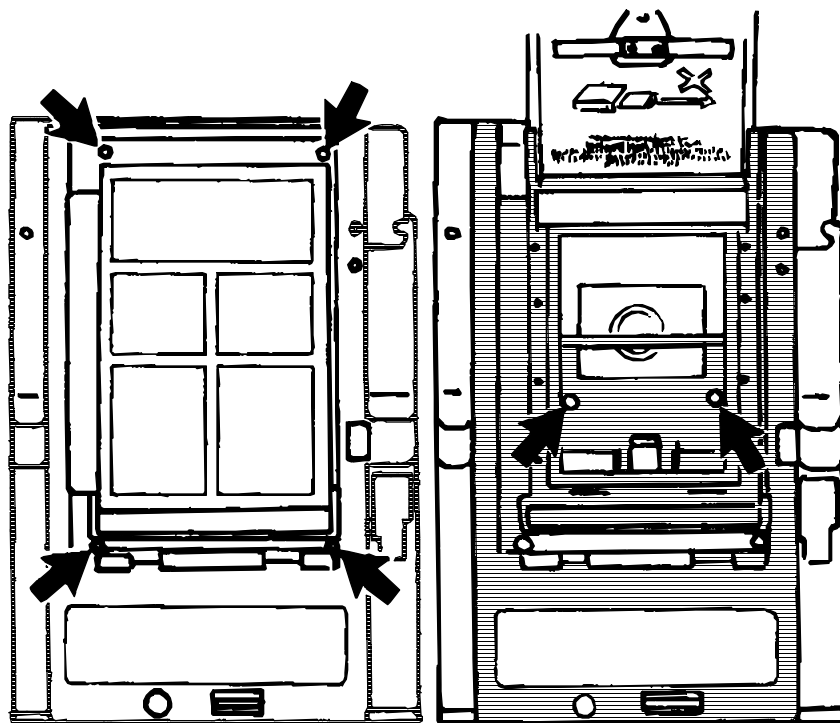


Figure 4-15 Removing Back Plate Screws

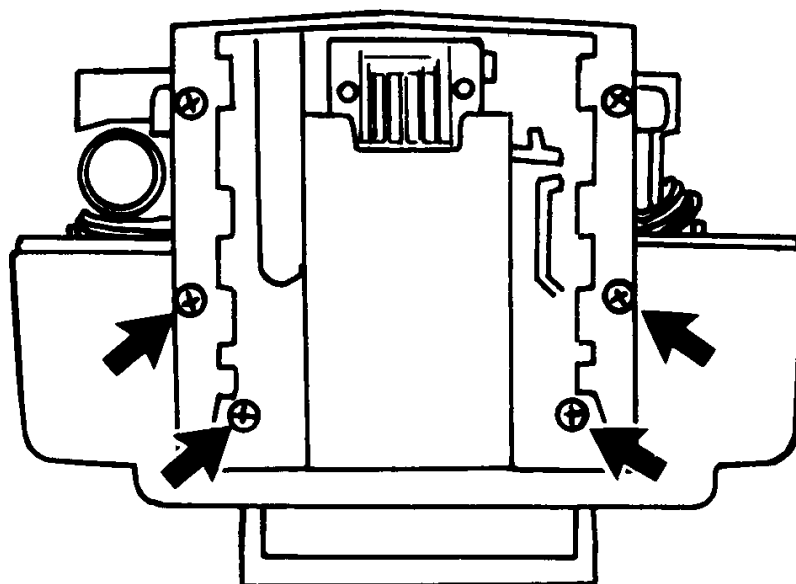


Figure 4-16 Loosening Baseplate Screws

## D. Level 2 Parts Removal

### 1. Back Cover

(Front Cover must be off)

- 1.1 Unplug black ground wire from J4 on Face Strobe Board.
- 1.2 Disconnect ribbon cables from J3 and J12 on Logic Board.
- 1.3 Remove six screws from Back Plate. Slide Camera Back half-way down and open door to gain access to top and middle screws. (Fig. 4-15)
- 1.4 Loosen (do not remove) four screws in Baseplate, (Fig. 4-16)
- 1.5 Lift Back Cover off Main Frame.

### 2. Counter

- 2.1 Disconnect Counter cable plug from Display Board, J3.
- 2.2 Squeeze locking tabs in on sides of Counter and push Counter out through opening in Back Cover.

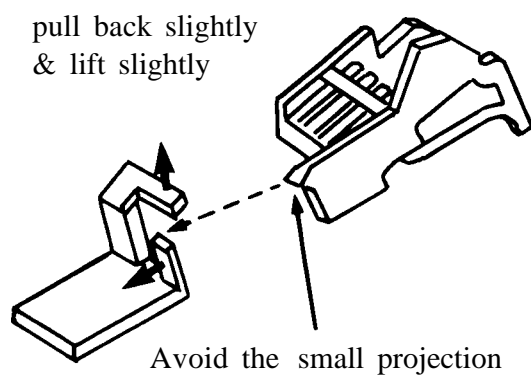


Figure 4-17 Releasing Locking Tab

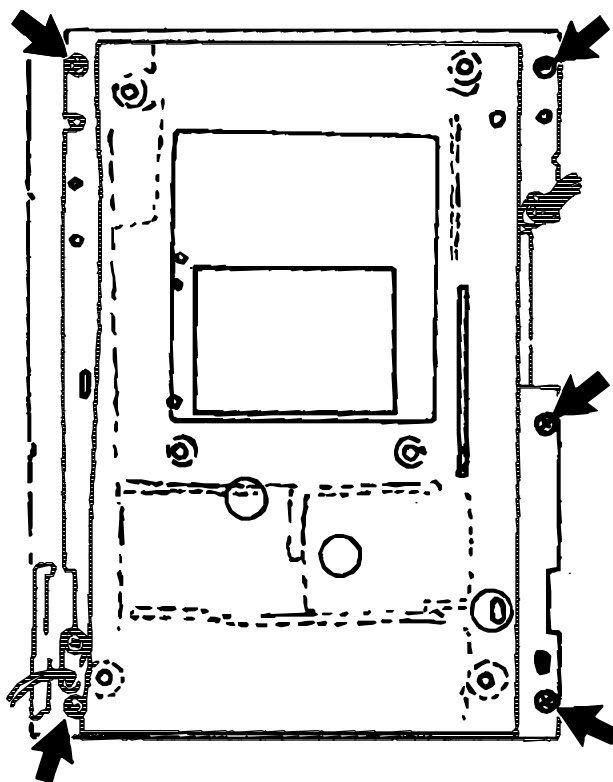


Figure 4-18 Removing Back Plate Screws

### **3. S1 (Shutter ) Switch Assembly**

- 3.1 Disconnect cable plug from Display Board, J1.
- 3.2 Remove tape from cable (note position).
- 3.3 Remove connector from switch. (Do this from the outside of the camera.)
- 3.4 Release locking tab at bottom of Switch. (Fig. 4-17)
- 3.5 Lift switch out of back cover (Fig. 4-17)

### **4. Display Board**

- 4.1 Disconnect cables connected to the Board.
- 4.2 Remove two nuts holding board in place.
- 4.3 Push board from inside: press first near J2 (middle jack) to release one end of the Board, then press at other end.

### **5. Back Plate Assembly**

- 5.1 Remove the five screws. (Fig. 4-18)
- 5.2 Lift off Back Plate.
- 5.3 Remove Wear Strip (metal or plastic) from track and note its position.

Note: When replacing Back Plate Assembly, if Wear Strip is metal, install it with sharp edge next to the housing, smooth edge against the Camera.

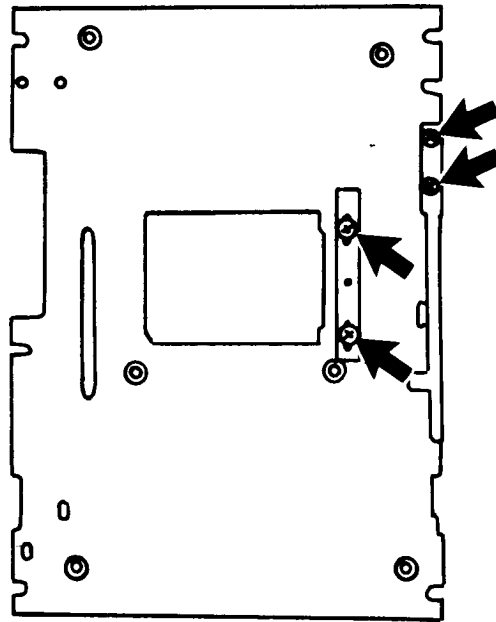


Figure 4-19 Removing Latch Mechanism and Camera Back Stop Screws

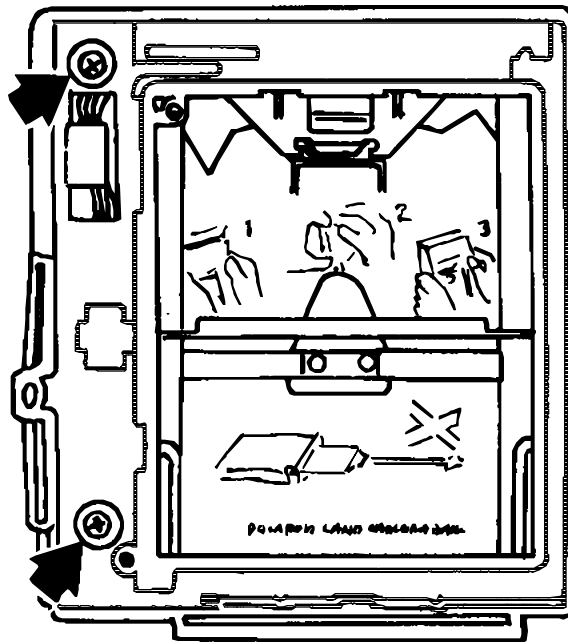


Figure 4-20 Removing Retaining Bracket Screws



**6. Latch Mechanism**

- 6.1 Remove the two screws holding it. (Fig. 4-19)

**7. Camera Back Stop**

- 7.1 Remove the two screws holding it. (Fig. 4-19)

**8. Base Slide Spacer Assembly**

- 8.1 With the latch mechanism and Camera Back removed, slide the Base Slide Spacer off of the Back Plate Assembly.

**9. Validation Plate Solenoid**

- 9.1 Peel off light seal felt.
- 9.2 Remove two screws from retaining bracket. (Fig. 4-20)

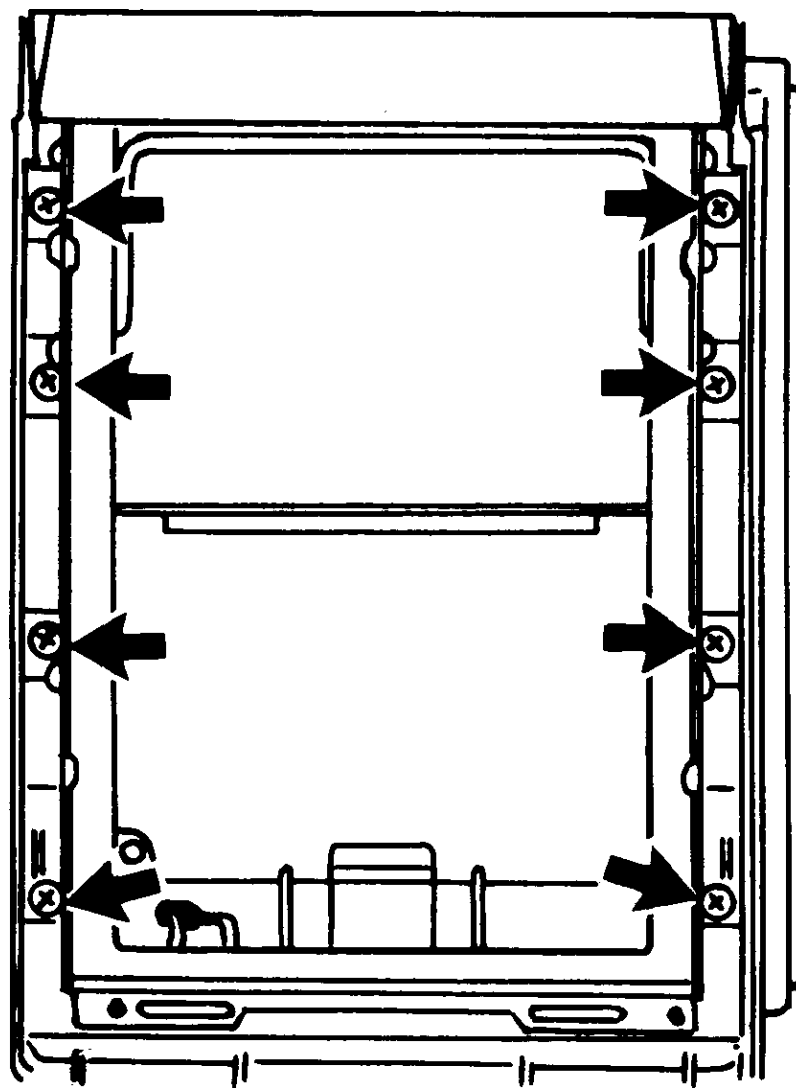


Figure 4-21 Removing Base Slide Spacer Assembly Screws

## **10. Camera Back from Base Slide Spacer Assembly**

- 10.1 Remove eight screws located inside assembly. This also gives access to the Pull Film Switch. (Fig. 4-21)

## **11. Logic Board**

- 11.1 Unplug all cables connected to Logic Board. Connections include the following, which are also shown pictorially in the accompanying Camera Head Wiring Diagram, Schematic A-3 (see Appendix).

J1 - Face Brightener Solenoid

J2 - Ranging Module

J3 - Display Board

J4 - Data Strobe (Timing) Board

J5 - Face Strobe Board

J6 - Data Card Sensors

J7 - Shutter Solenoid and Shutter Sync Contacts

J8 - Sensor Board

J9 - Empty (for external computer RS232)

J10 - Mirror Motor Drive Board

J11 - Aim Light

J12 - Display Board

- 11.2 Remove the screw or retaining key holding Logic Board, release latch, slide Board toward top of Camera, pivot board up and out.

Notes

## **12. Face Strobe Board**

- 12.1 Remove two connectors (J12 and J13) from Face Strobe Board.
- 12.2 Remove screw and spacer holding Face Strobe Board, release latch, slide Board toward top of Camera, up and out.

## **13. Data Strobe Boards**

(Quench and Timing) (See Schematic A-8, Appendix.)

- 13.1 Remove insulation paper from Data Strobe Board (note position).
- 13.2 Disconnect six wire leads to Data Flashtubes.

**CAUTION: NEVER FIRE DATA STROBES WITH FLASHTUBES DISCONNECTED. THIS CAN DESTROY THE BOARD!**

- 13.3 Remove two screws holding Data Strobe Board.

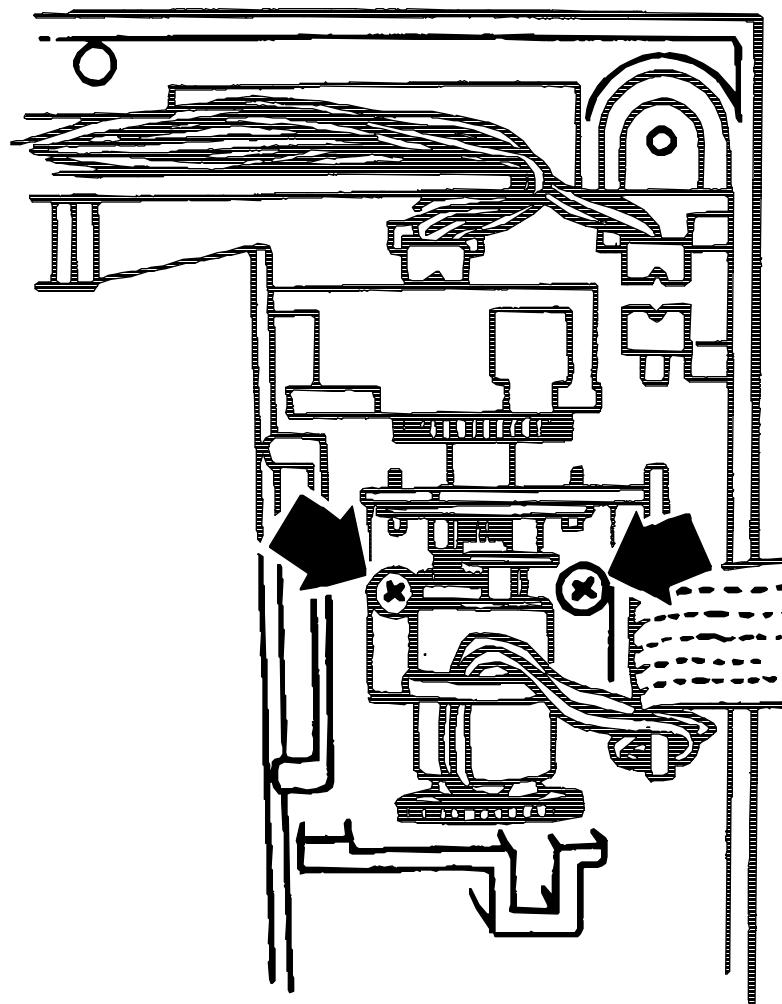


Figure 4-22 Removing Screws from Motor Drive Bracket

**14. Upper (moveable) Mirror**

- 14.1 Press lock tabs away from Mirror back (toward Motor) and slide Mirror up and out.

**15. Motor Drive**

- 15.1 Remove two screws from bottom of Bracket. (If both screws are not visible, move Mirror Carrier out of the way: rotate gear train by turning gear near Motor with finger.) (Fig. 4-22)

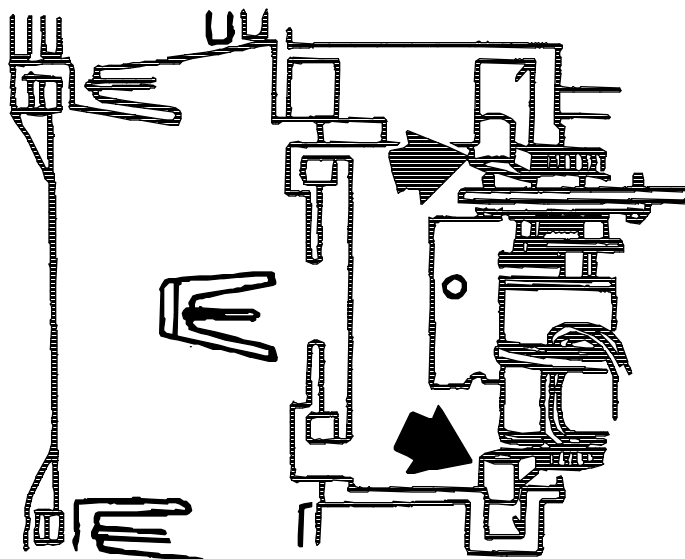


Figure 4-23 Rotating Cam Pivots Into Position

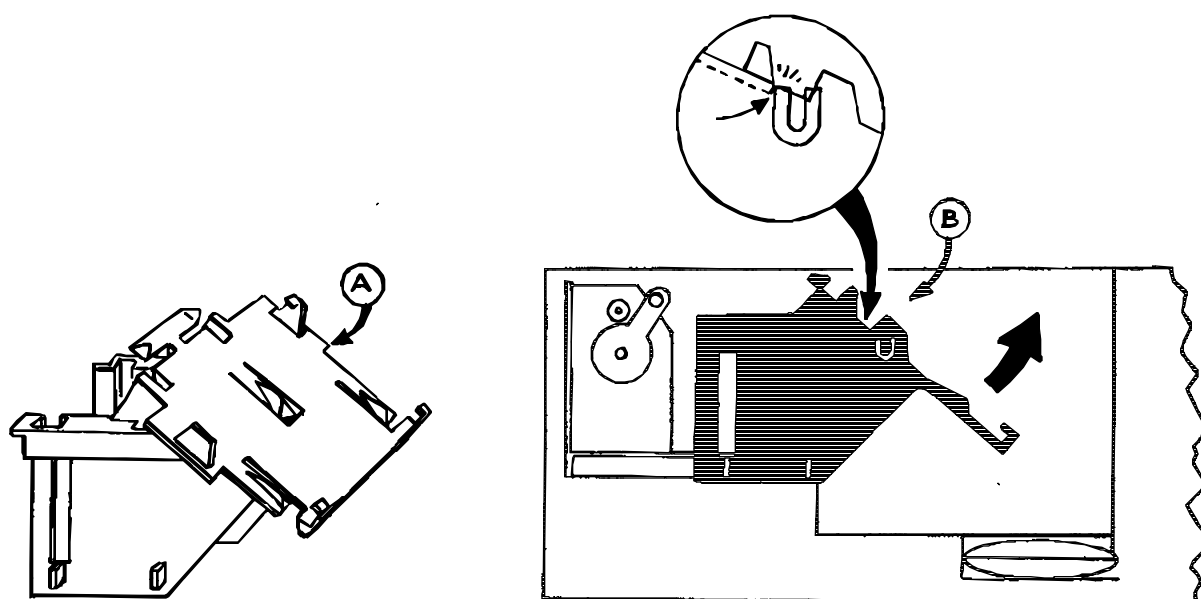


Figure 4-24 Sliding Carrier



## **16. Mirror Carrier**

- 16.1 Remove Data Lens.
- 16.2 If Motor Drive is present, rotate gears manually (see 15.1) until cam pivots are in position shown (out of the Carrier channels). (Fig. 4-23)
- 16.3 Slide Carrier to right (toward base of Camera) and lift slightly so that projecting tab "A" on Carrier slides past projection "B" on Base Block. (Fig. 4-24)

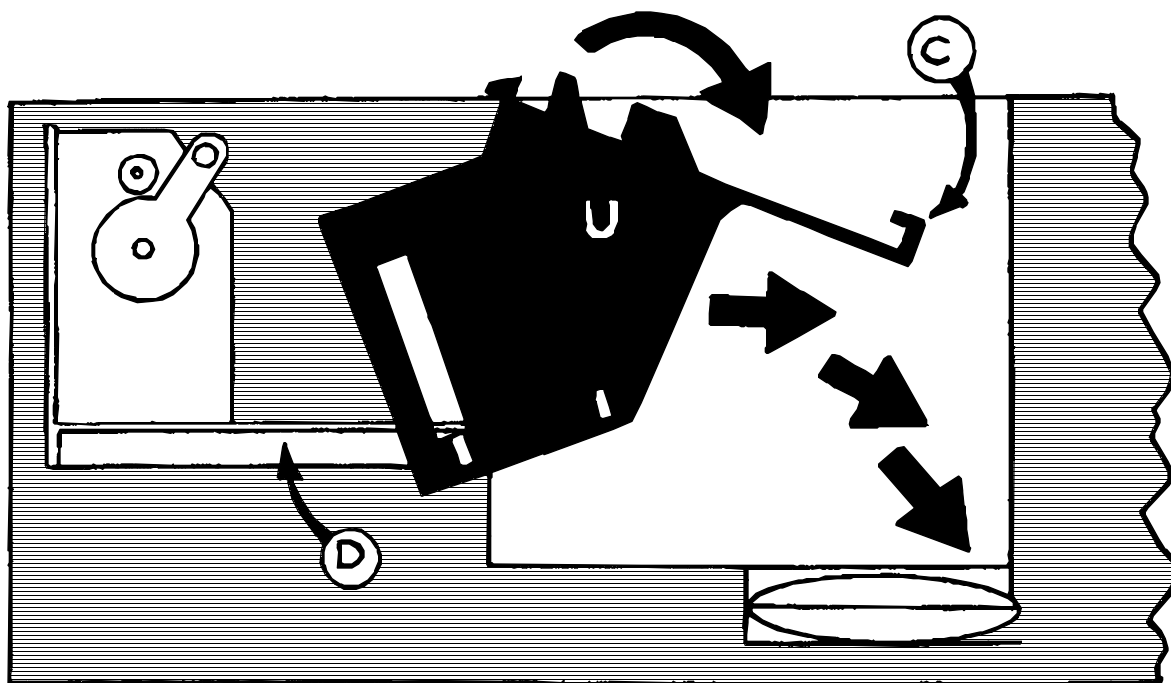


Figure 4-25 Freeing Carrier

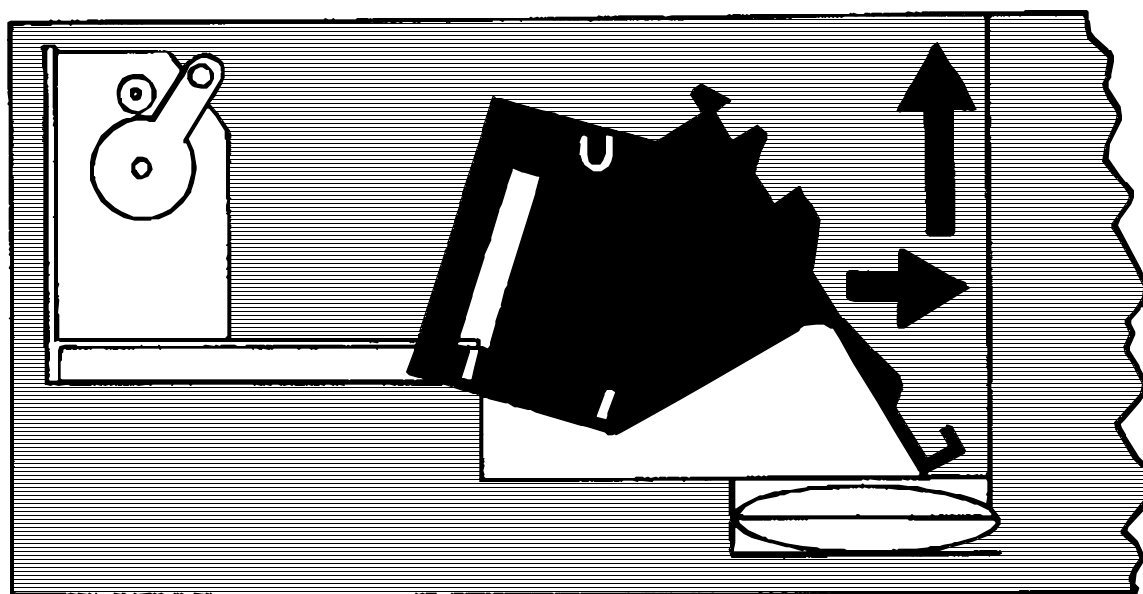


Figure 4-26 Sliding Mirror Up

16.4 Continue sliding Carrier to the right, then tilt the front of the Carrier "C" (part closest to the lens) downward toward the lens to free it from channels "D". (Fig. 4-25)

16.5 Lift Carrier straight up out of Base Block.  
**REMOVE SLOWLY AND LIFT OUT AS STRAIGHT AS POSSIBLE.**

**17. Lower Mirror**

17.1 Push in (compress) retaining bar and lift it out.

17.2 Slide Mirror up and out. (Fig. 4-26)

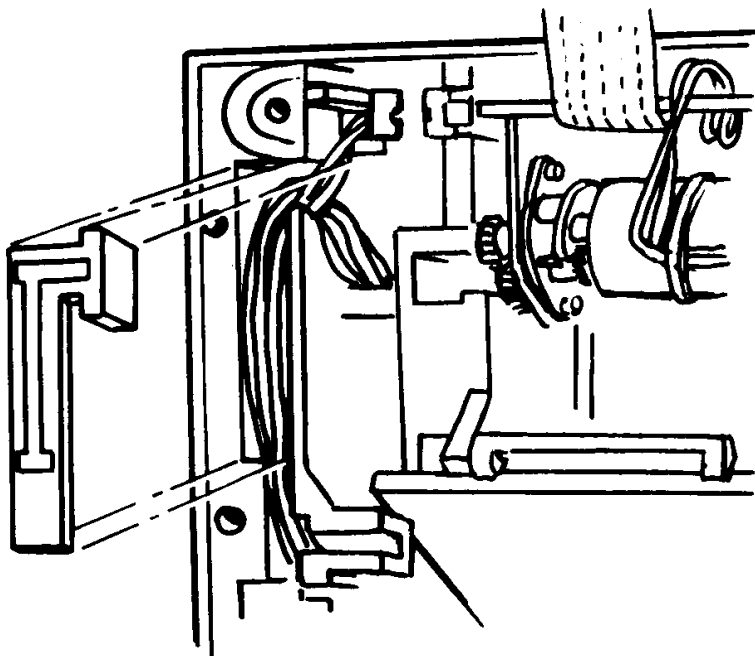


Figure 4-27 Lifting Out Wire Retainer

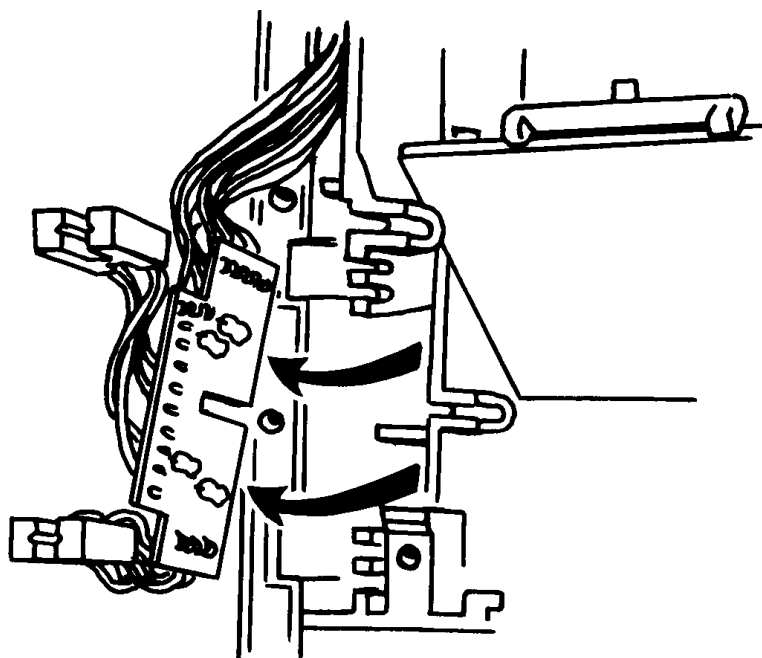


Figure 4-28 Sliding Sensor Board Up and Out

**18. Photo Sensors**

- 18.1 Lift out Wire Retainer. (Fig. 4-27)
- 18.2 Lift out Sensors: grasp beyond Retaining Clip.
- 18.3 Slide Sensor Board with attached Sensors up and out. (Fig. 4-28)

Notes

## **19. Face Polarizer**

(Can be removed from assembled Camera through Camera Back Door.)

- 19.1 Cycle camera to mirror up (face taking) position.
- 19.2 Insert tip of Face Polarizer Removal Tool under Polarizer lip and pry up carefully.

### **Notes on replacing the Face Polarizer**

1. Place the Face Polarizer over the rear lens, with the notch on the Polarizer over the stud on the housing. Be careful not to break the stud.
2. Place the Face Polarizer Installation Tool (P/N 11522) over the Polarizer - make sure it is centered.
3. Tilt the Tool handle slightly and apply pressure to seat one of the Polarizer securing tabs.
4. With a rocking motion of the handle, press down and seat each of the Polarizer tabs in succession. A click will be heard as each tab seats.

Notes



## **20. Shutter Assembly**

- 20.1 Cycle camera to mirror up (face taking) position.
- 20.2 Remove face polarizer. (Can be removed from assembled Camera through Camera Back Door.)
- 20.3 Disconnect Sync Chord at Shutter
- 20.4 Remove Shutter Retaining Ring (and Back-up Washer) with Shutter Removal Tool P/N 11523. Lift Shutter Assembly Linkage out of Baseblock.
- 20.5 Linkage rivets may be removed and/or replaced using the following tools:

P/N 13433	Rivet Fixture
P/N 13440	Rivet Installer
P/N 13439	Rivet Remover

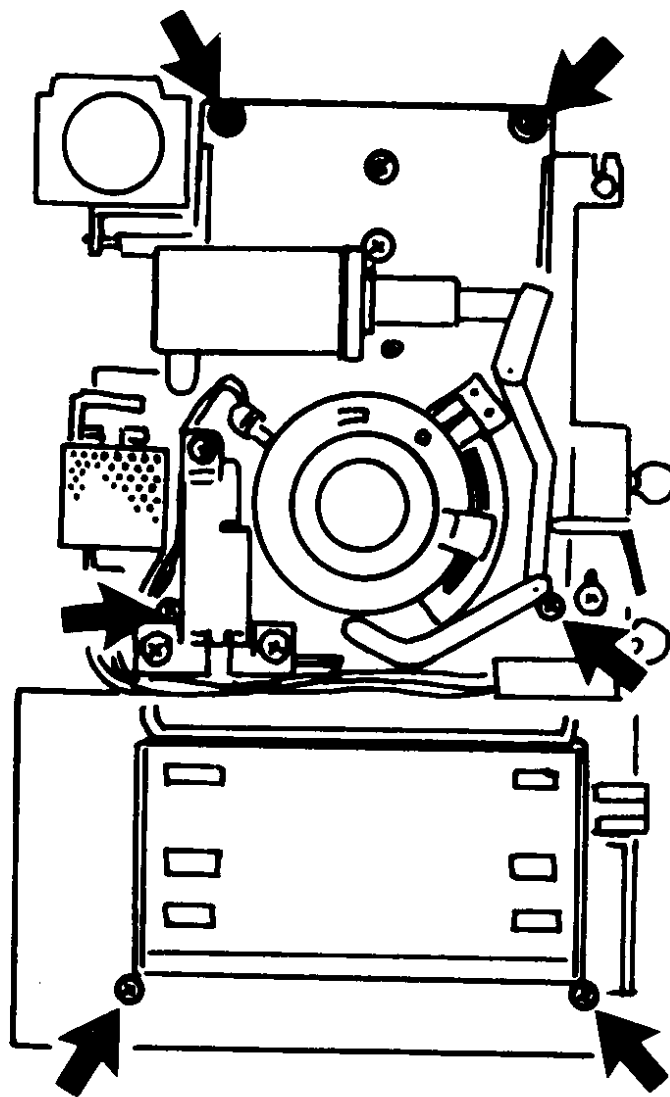


Figure 4-29 Removing Baseblock from Main Frame

**E. Level 3 Parts Removal  
(Main Frame and Baseblock)**

**1. To Separate Main Frame from Baseblock**

- 1.1 Pull wire leads from Data Flashtubes through slot in Main Frame. (Note: This slot maybe enlarged using needle-nose pliers to a 'v-slot' to ease wire routing.)
- 1.2 Removesix screws holding Baseblock to Main Frame, exposing Data Flashtubes on opposite side of Baseblock. (Fig. 4-29)

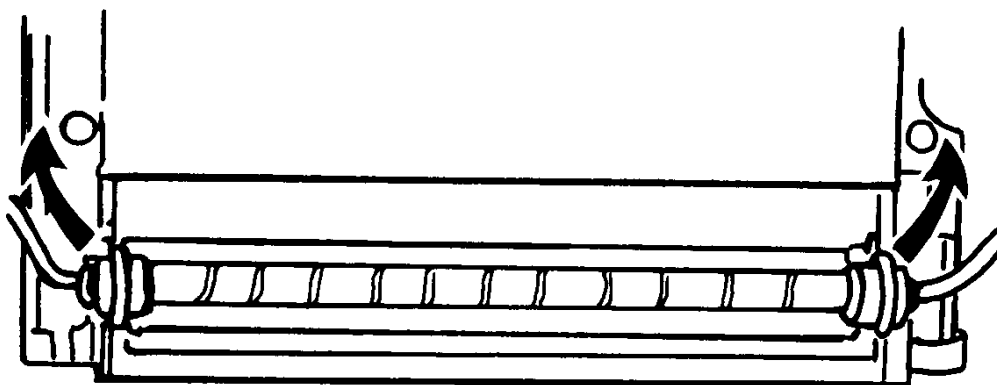


Figure 4-30 Lifting Out Flashtubes

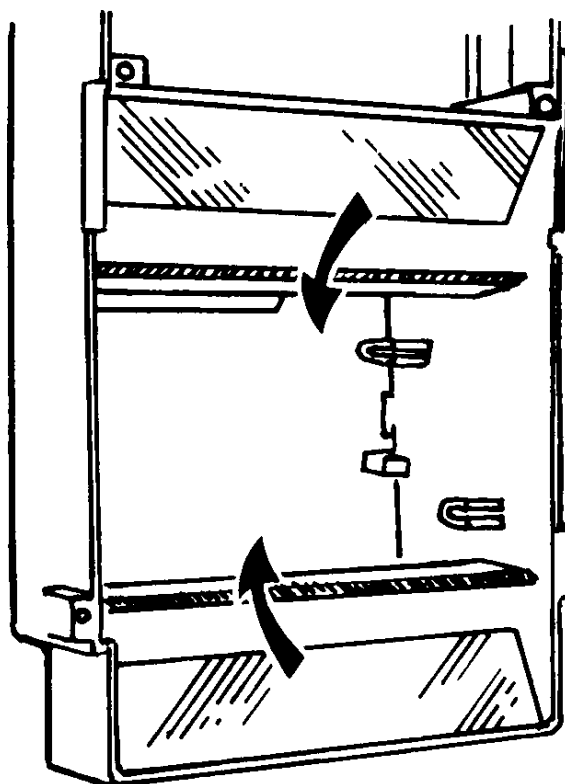


Figure 4-31 Removing Horizontal Reflectors

- 1.3 Flashtubes are held in place by grommets at ends. Lift out Flashtubes by gently pulling up on wires at each end. (Fig. 4-30)
- 1.4 Slide out Flash Channels and Parallel Reflectors.
- 1.5 In the Main Frame, remove Horizontal Reflectors by sliding them down and out. (Fig. 4-31)

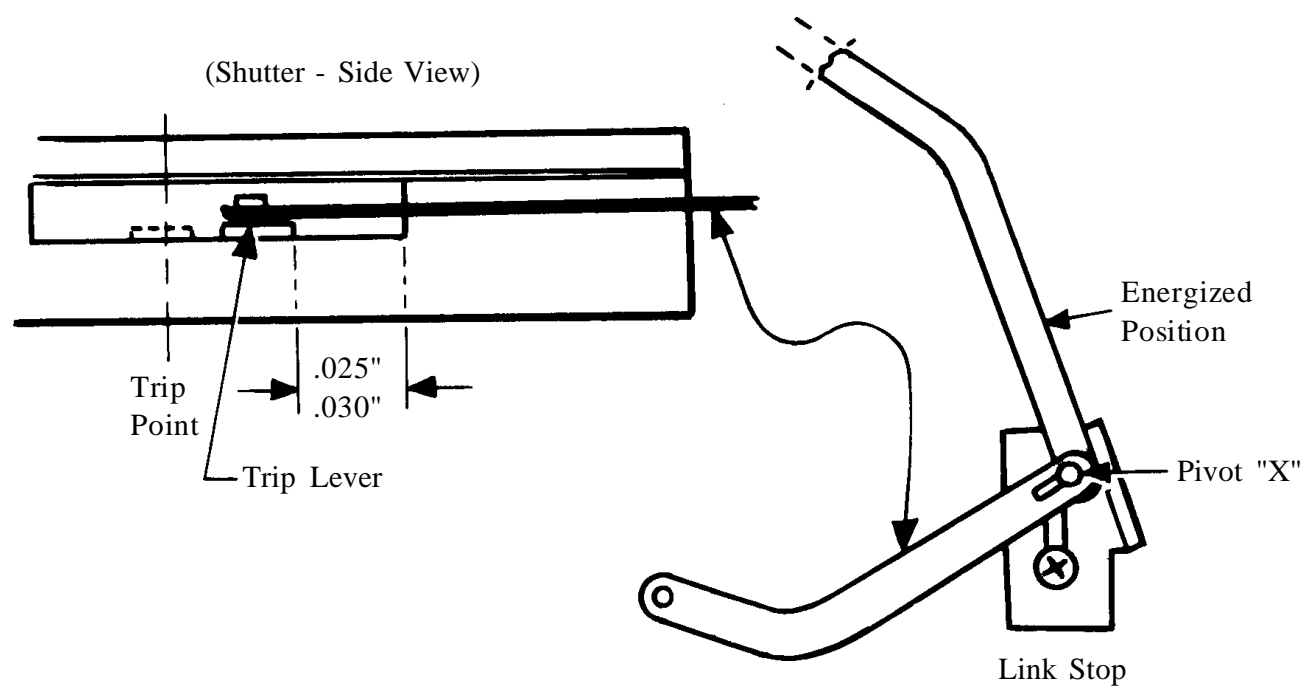


Figure 4-32 Setting Shutter Linkage

## **F. Adjustment Procedures**

### **1. Setting the Shutter Linkage**

1.1 Loosen screw holding Shutter Link Stop and adjust its position to allow a gap of approximately 0.025" - 0.030" between the Shutter Trip Lever and end of the opening in the Shutter housing. (Fig. 4-32)

1.2 Retighten the Link Stop screw. (Be sure Trip Lever travels far enough to trip Shutter.)

Note: The purpose of this adjustment is to prevent Trip Lever from striking Shutter housing when tripped.

1.3 Loosen screws in Solenoid bracket. Position the Solenoid body so that when plunger is all the way in (energized position), linkage pivot "X" is at the right end of the slot, as shown in the illustration (Fig. 4-30).

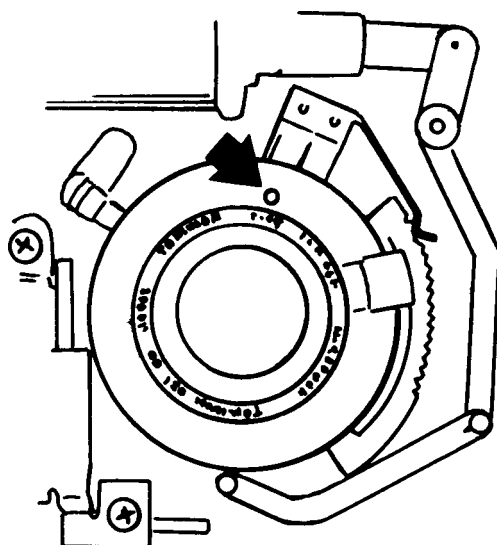


Figure 4-33 Holding Shutter Blades Open

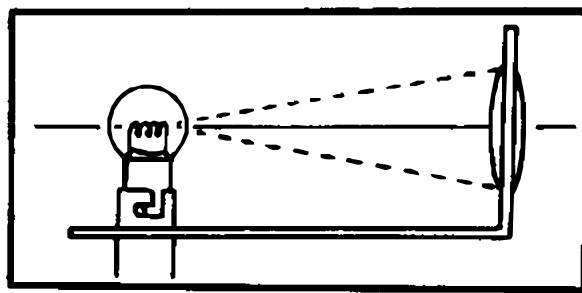
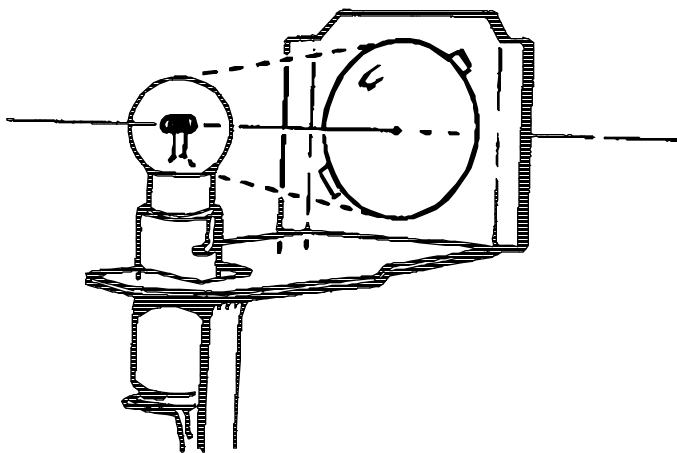


Figure 4-34 Sharpening Aim Light Image



## **2. Setting the Aim Light**

- 2.1 Set up the ID-4 Camera the correct distance from a white wall (or target) – either 54" (137 cm) or 40" (102 cm).
- 2.2 Turn Face Brightener Bezel to Full Lighten.
- 2.3 Remove the Lens Bezel (or Close-up Lens).
- 2.4 Remove the Aim Light Cover.
- 2.5 Insert Aiming Val Plate (P/N 11535) into Camera.
- 2.6 Turn Camera power ON.
- 2.7 Insert Data Card (to move mirror up).
- 2.8 As you depress the Face Fire Button S1, insert the end of a large paper clip in the hole in the Shutter, to hold the blades open (see illustration). (Fig. 4-33)
- 2.9 Immediately shut off the power before the mirror moves down.
- 2.10 Attach an 8-10V DC power supply to the Aim Light bulb leads.

**CAUTION: POWERING THE BULB WITH OVER 12V CAN SHORTEN BULB LIFE.**

- 2.11 Observe the position of the Aim Light beam spot on the Test Val Plate. Adjust it to the proper position with a 3/32" ball-end Allen wrench.
- 2.12 The sharpest Aim Light image occurs when the bulb filament axis coincides with the Aim Light optical axis. If the bulb filament axis is off, bend the base of the Bracket slightly with pliers, observing the effect on the image on the wall. (Fig. 4-34)

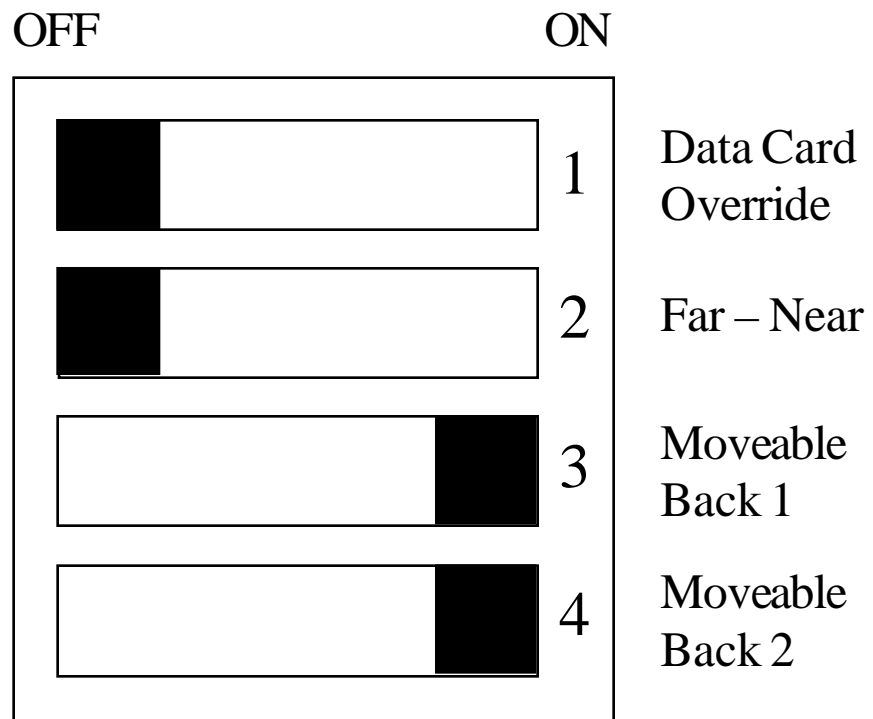


Figure 4-35 Setting the DIP Switch S2

- 2.13 Always take a test picture after setting the Aim Light, to verify that the setting is correct.

**3. Setting the DIP Switch S2**  
(Refer to Fig. 4-35, opposite)

- 3.1 Position 1 should be OFF if only one Data Card exposure is to be made by inserting a Data Card (One-up format), or ON if a second exposure of the same card is to be made automatically when the Camera Back is moved to the down position (i.e., the data card need not be pulled out and reinserted).
- 3.2 Position 2 should be OFF if Standard Lens is in use (54" or 137 cm to subject), ON if No. 663 Close-Up Lens is in use (40" or 102 cm to subject).
- 3.3 Set Sections 3 and 4 of this Switch **together**, according to the type of Camera Back being used:
- Moveable Back (Two-up format):  
S2-3 and S2-4 both ON
  - Non-Moveable Back (One-up format):  
S2-3 and S2-4 both OFF

Notes

#### **4. Focusing the Face Lens**

Note: If the subject image is not sharp on the ID card, or the Shutter/Lens Assembly has been removed or replaced, refocusing may be necessary.

4.1 Install the special Ground Glass Film Pack P/N 11534 in the film compartment.

4.2 Lock Shutter open.  
(see previous section "Setting Aim Light")

4.3 Set Camera so lens is exactly 54" (137cm) from Lens Resolution Target P/N 11520.

4.4 Check image on ground glass with 7X or stronger loupe. If lens is properly focused, ground glass image should be sharp (28 lines/mm is the spec). If not sharp, proceed as follows.

4.5 Manually loosen the front lens element assembly.  
**DO NOT USE TOOLS!**

Note: You may need to apply a few drops of methanol to the threads of the front element to free the cement which prevents it from turning.

4.6 Rotate front lens element until sharpest possible image occurs.

4.7 When satisfied that image is sharpest, apply a drop of Duco Cement in the threads to secure the lens setting.

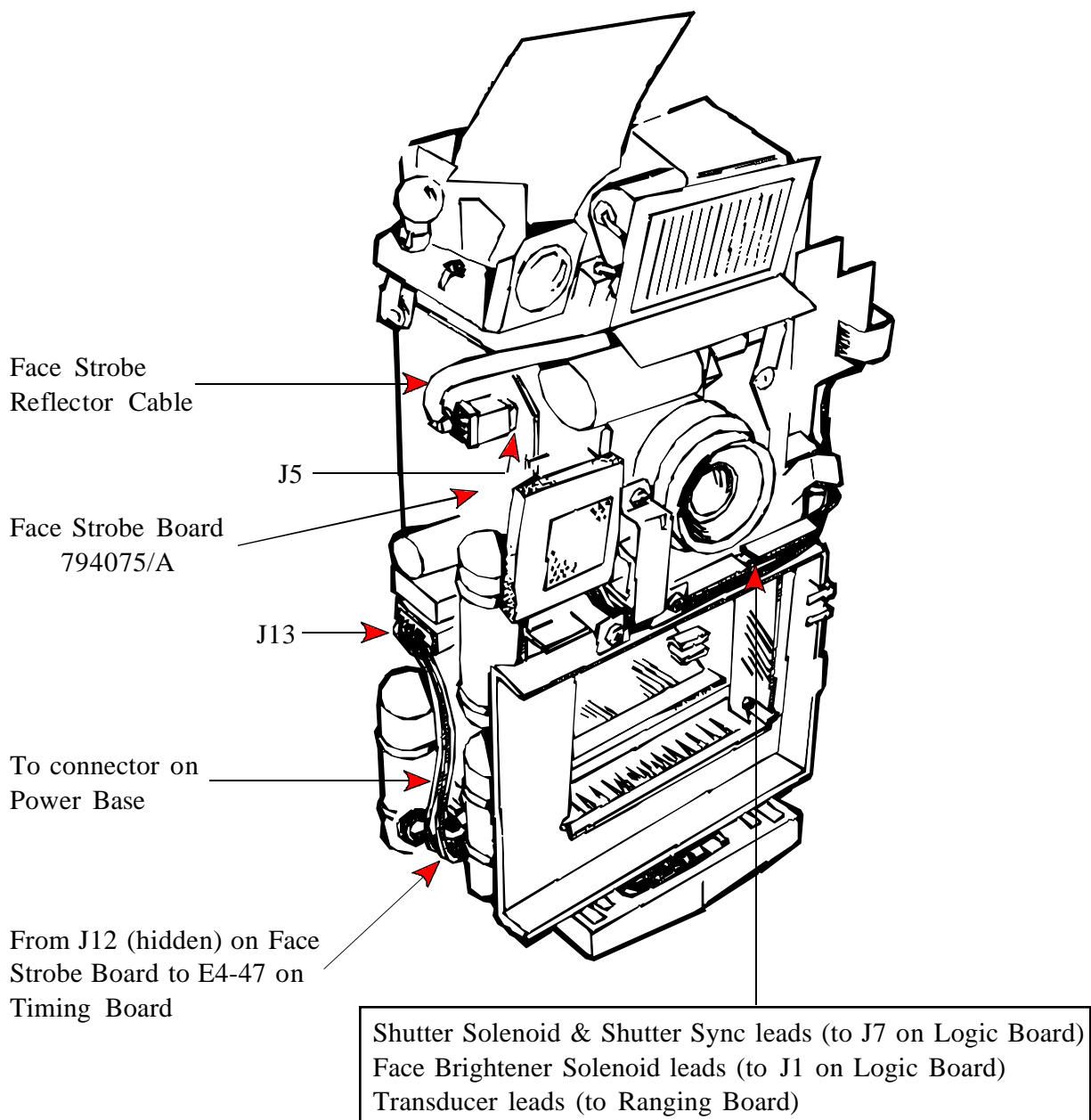
Notes

## 5. Replacing the Face Polarizer

- 5.1 Place the Face Polarizer over the rear lens, with the notch on the Polarizer over the stud on the housing. **Be careful not to break the stud.**
- 5.2 Place the Face Polarizer Installation Tool (P/N 11522) over the Polarizer – make sure it is centered.
- 5.3 Tilt the Tool handle slightly and apply pressure to seat one of the Polarizer securing tabs.
- 5.4 With a rocking motion of the handle, press down and seat each of the Polarizer tabs in succession. A click will be heard as each tab seats.

## G. Camera Wire Routing

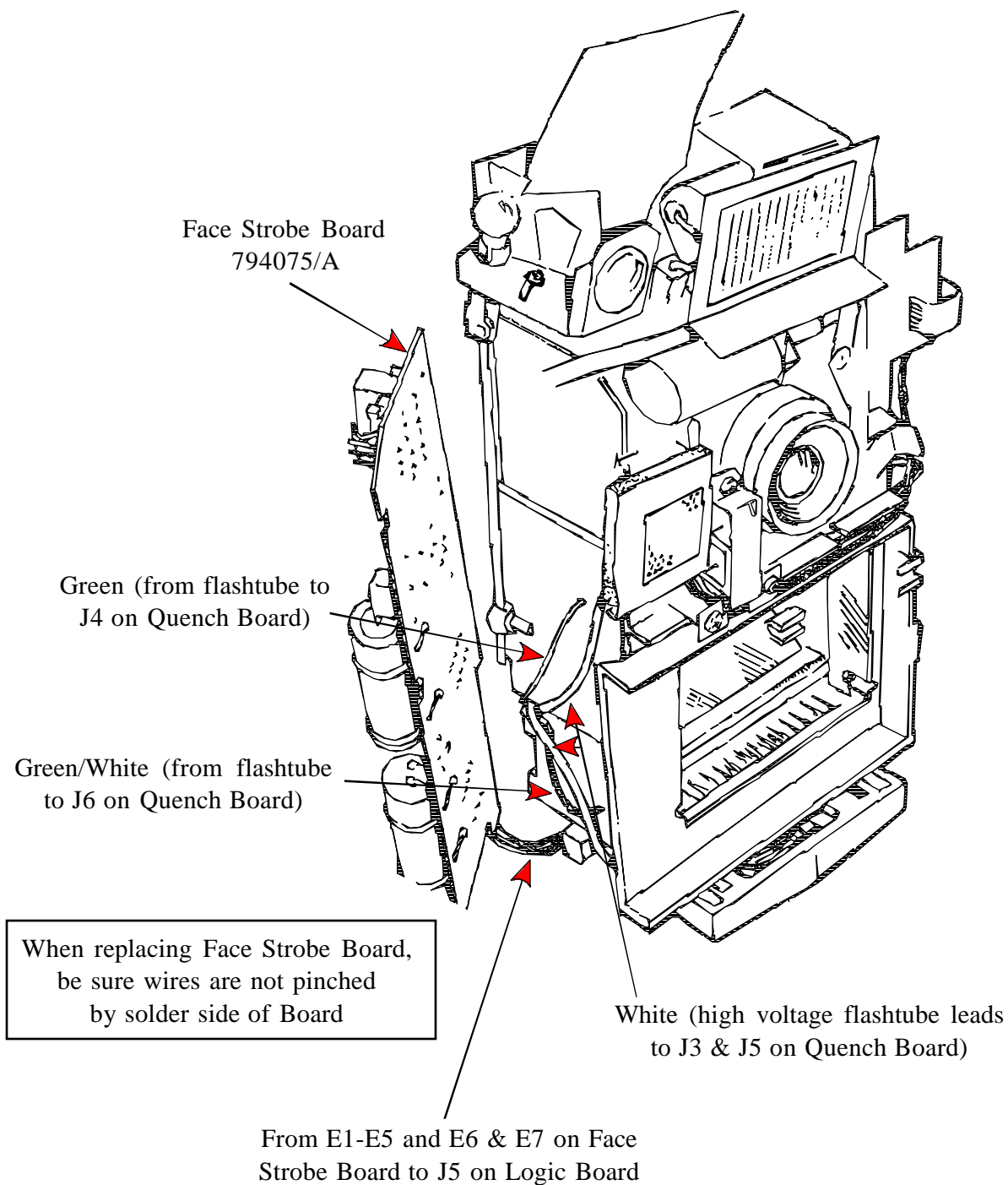
### 1. Face Strobe Board, Shutter, Face Brightner, Transducer Wiring



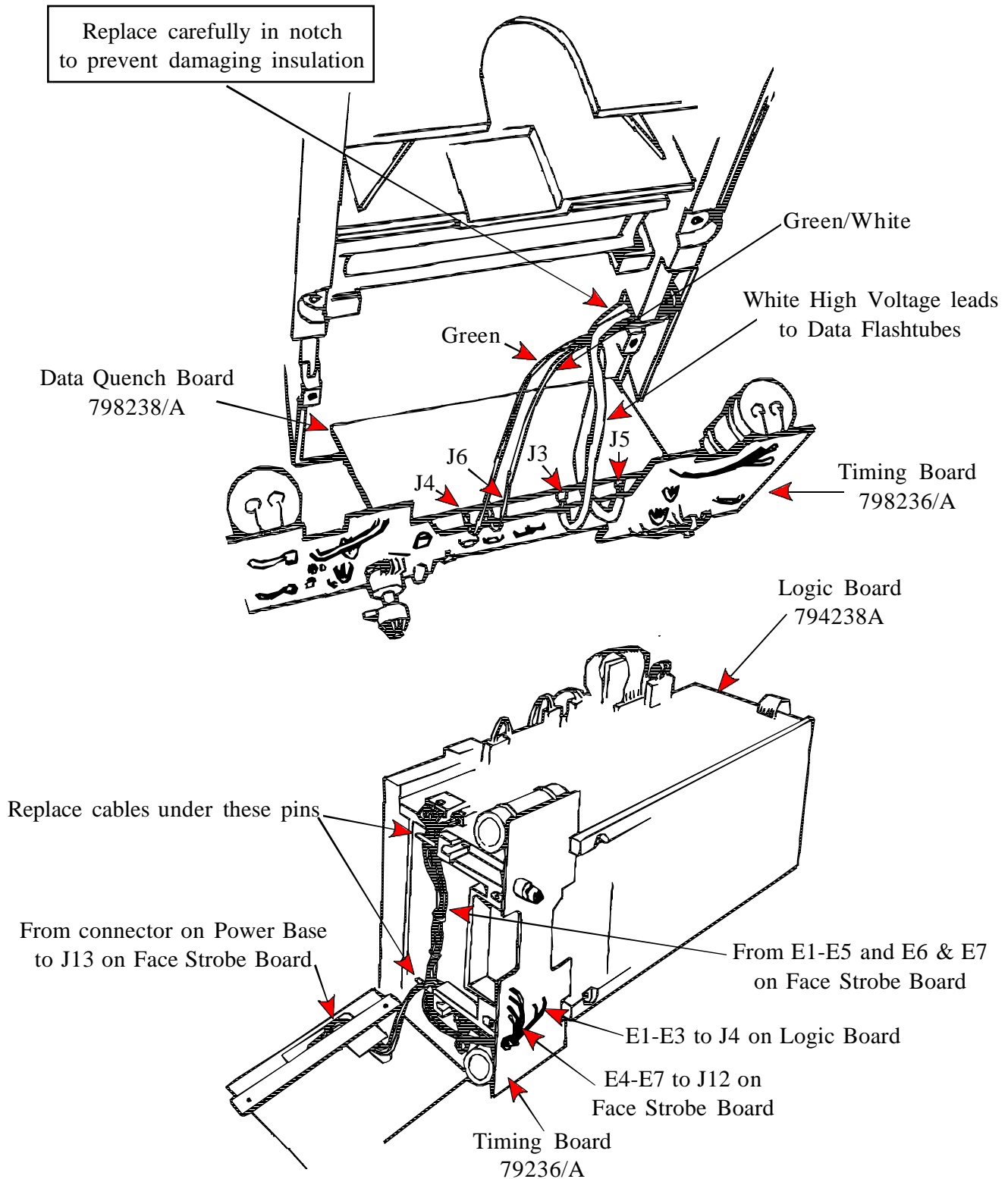
All wires in channel below lips, secured by foam retainer



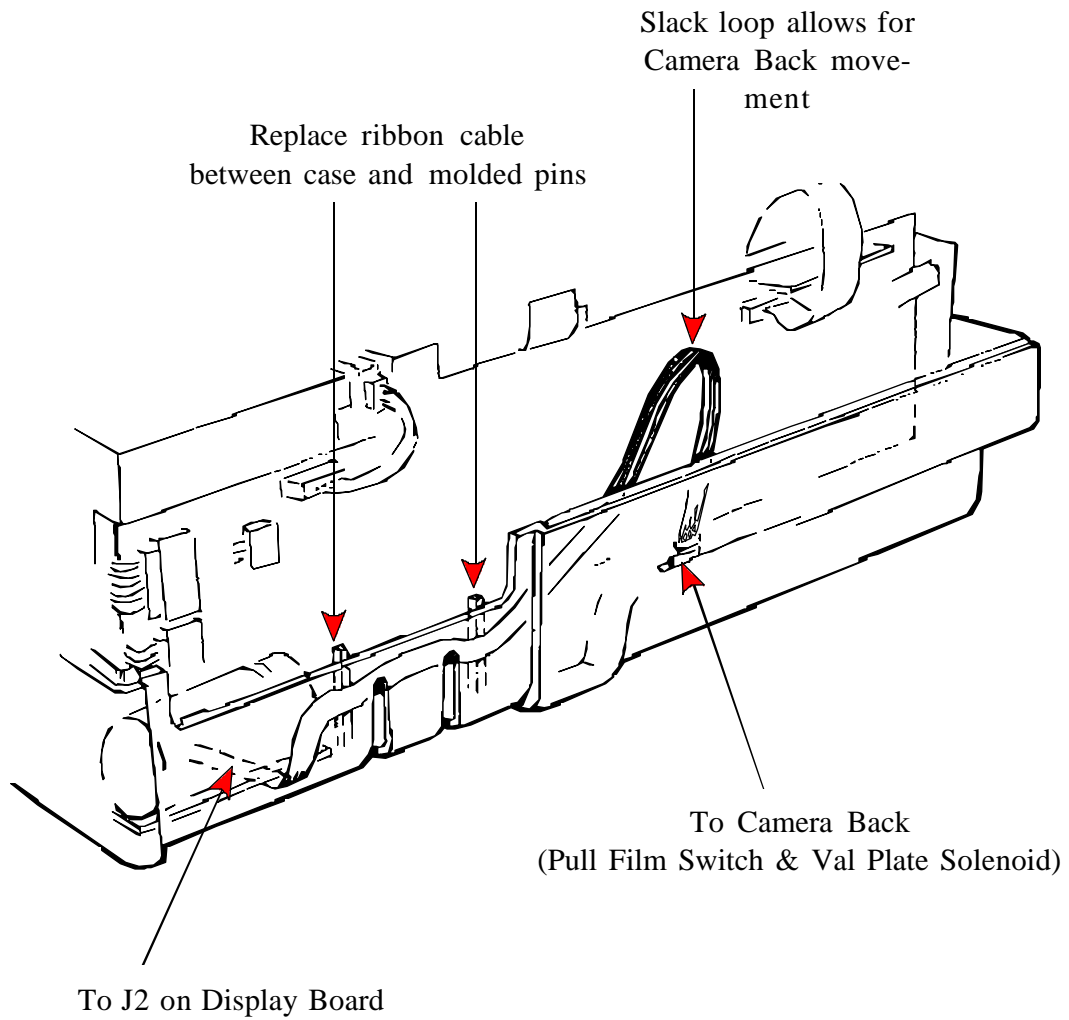
## 2. Data Flashtube & Face Strobe Board Wiring



### 3. Wiring Between Quench, Timing, Face Strobe & Logic Boards



#### 4. Ribbon Cable Connecting Camera Back & J2 Display Board



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# **APPENDIX**

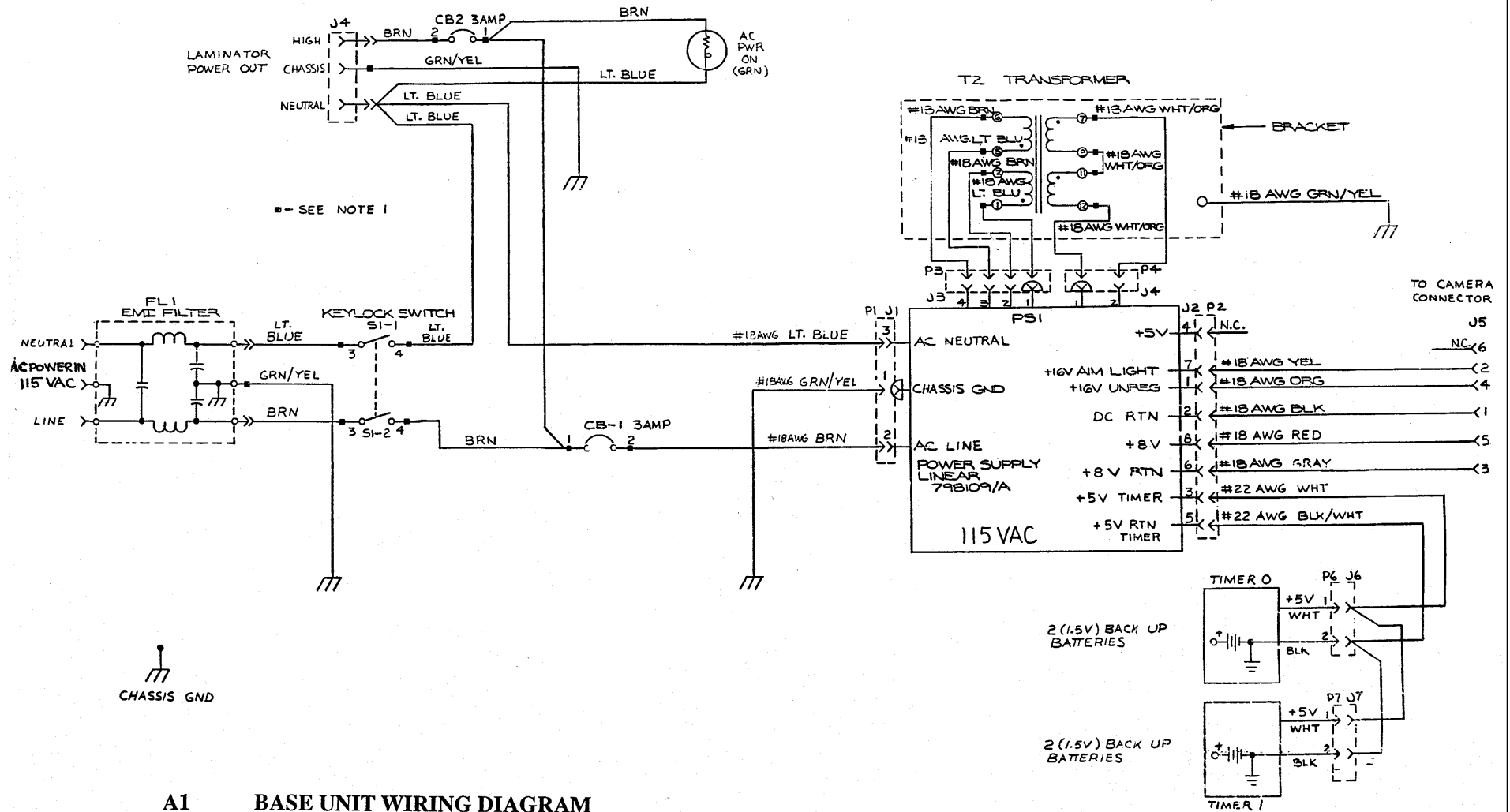
## **SCHEMATICS**

Notes

## Appendix - Schematics

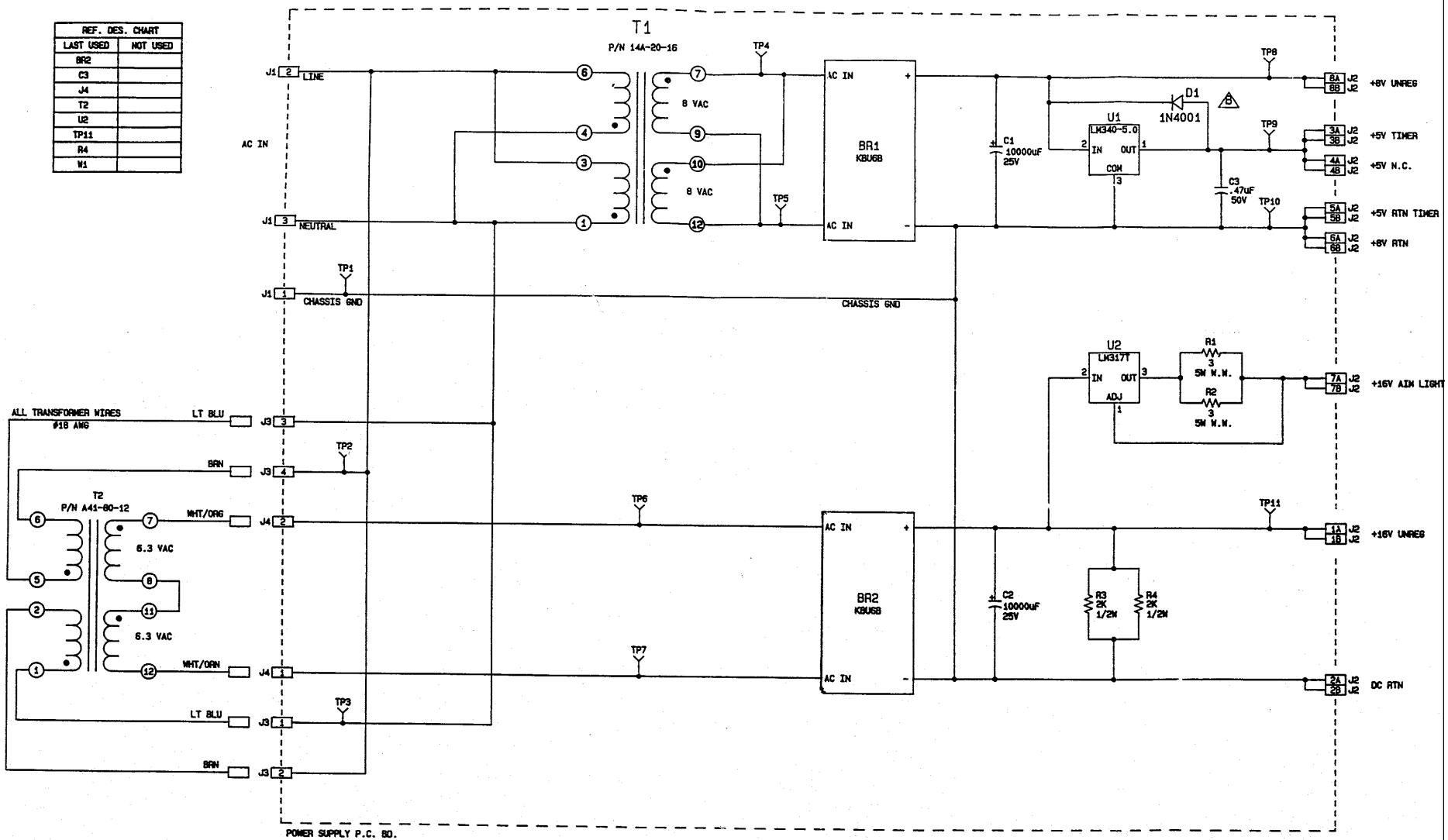
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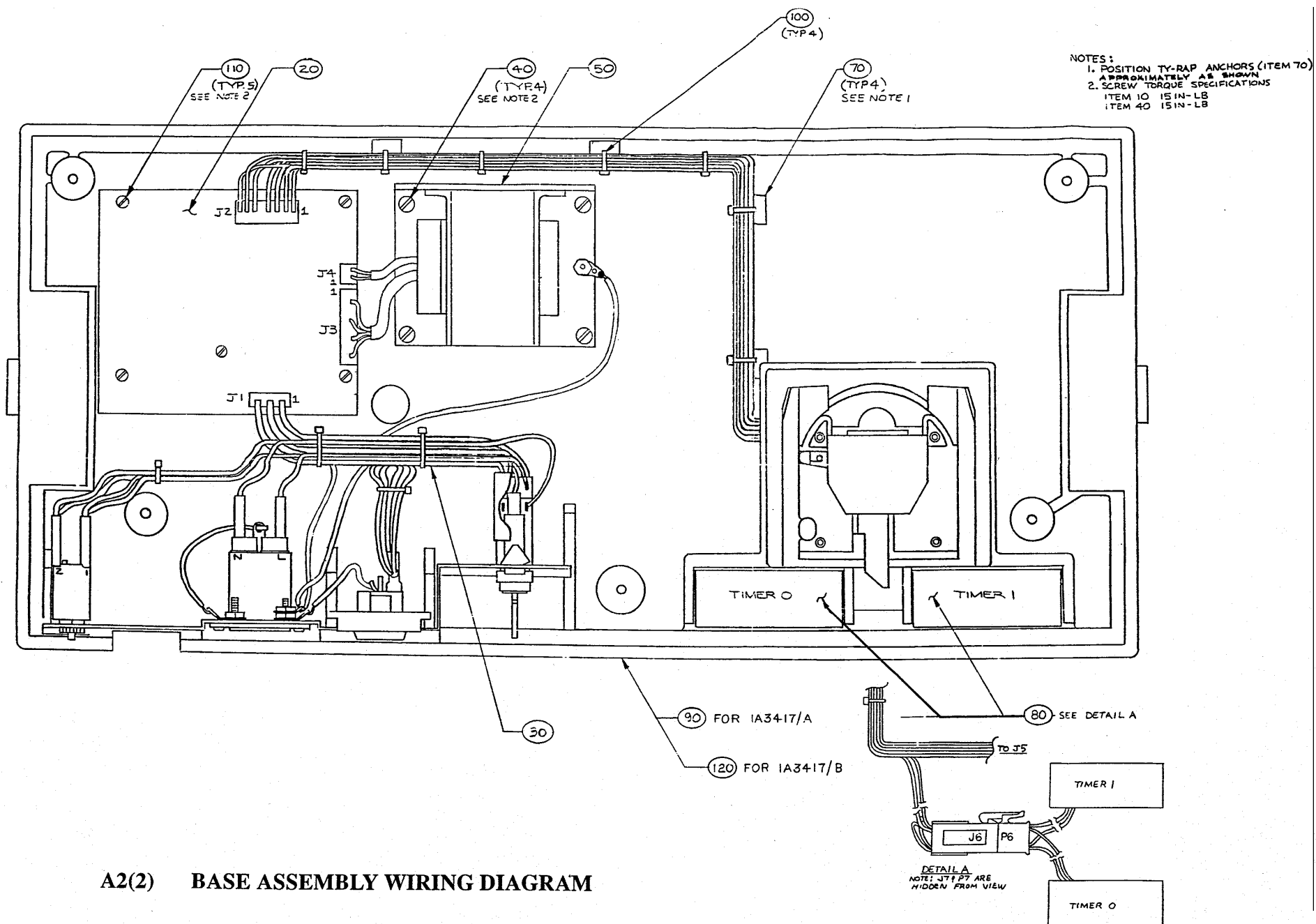




REF. DES. CHART	
LAST USED	NOT USED
BR2	
C3	
J4	
T2	
U2	
TP11	
R4	
W1	

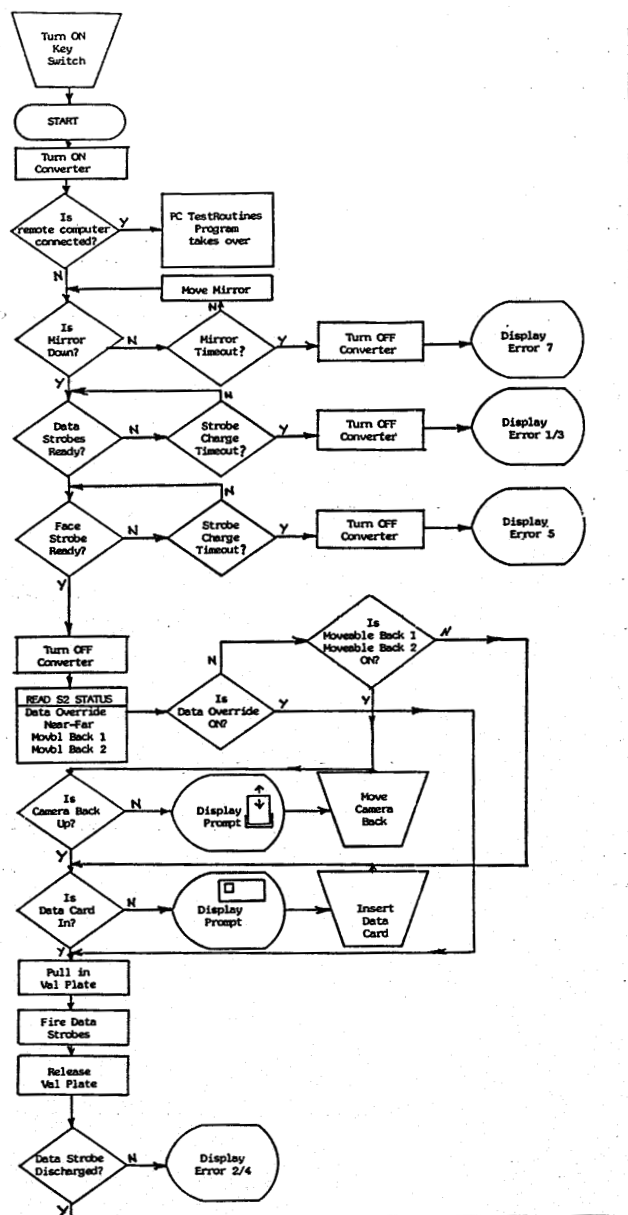


## A2(1) POWER SUPPLY, UNREGULATED



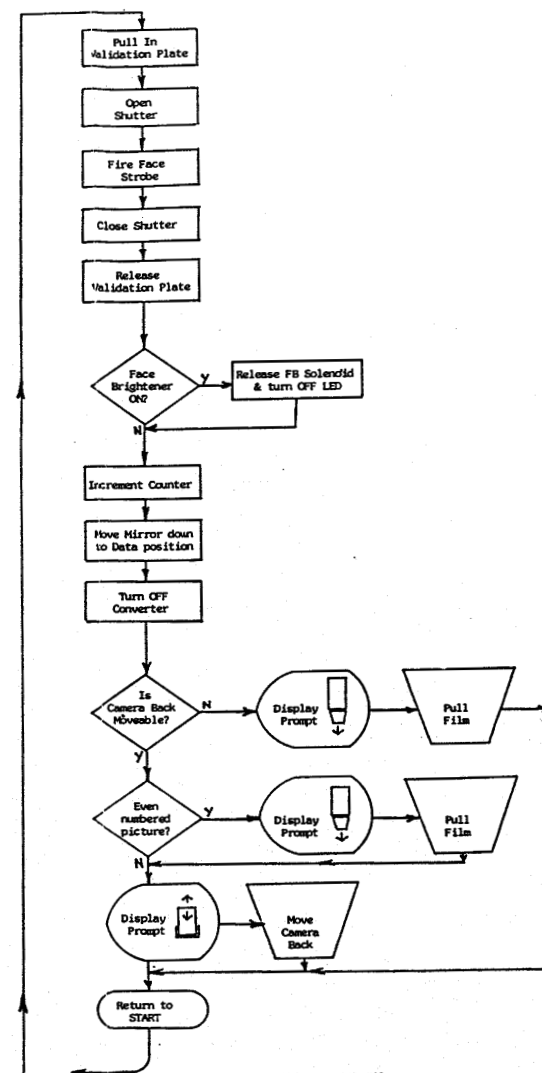
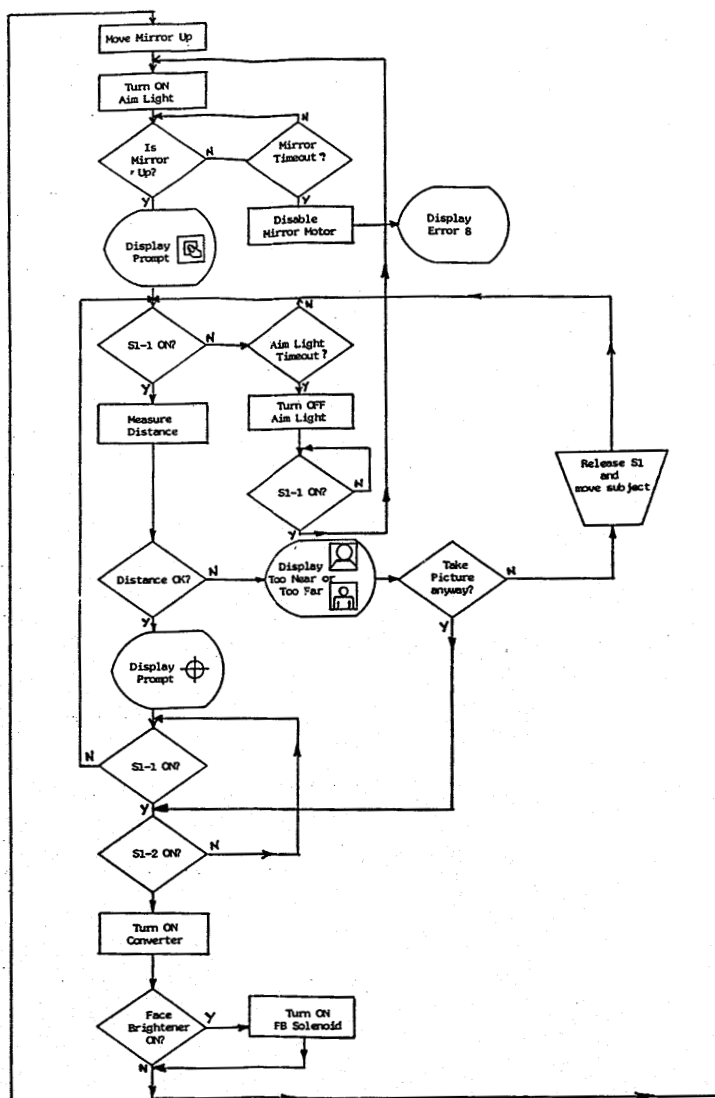
A2(2) BASE ASSEMBLY WIRING DIAGRAM





A4

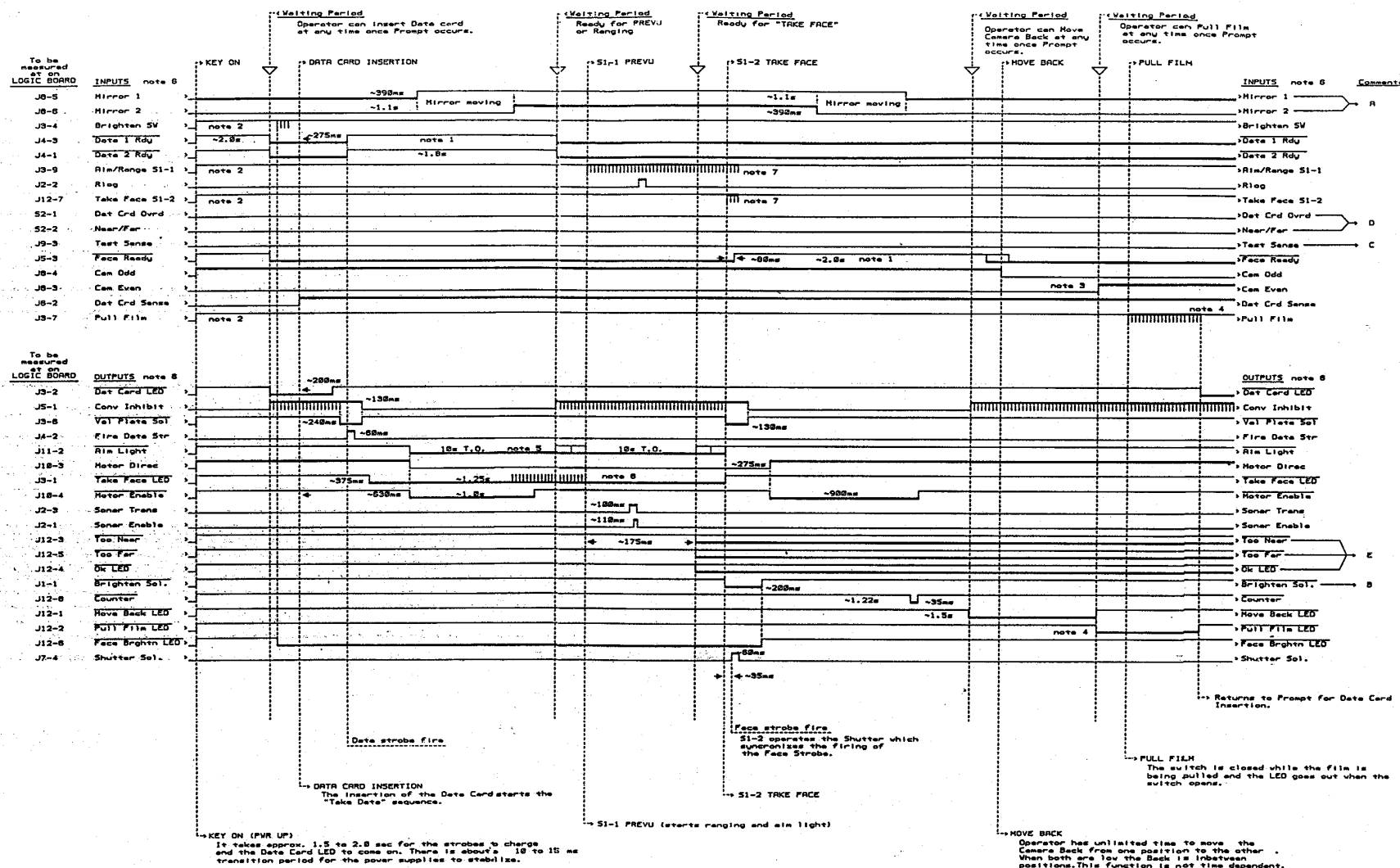
## SYSTEM PROGRAM FLOW CHART



## SYSTEM ERROR DISPLAYS

LEDs 1 & 8 (INSERT DATA CARD & FACE BRIGHTENER ON) alternately flash, and LEDs listed below illuminate, to show a System error has occurred:

Error No.	TIME FACE LED 2	PULL FILM LED 4	TOO CLOSE LED 5	DISTANCE OK LED 6
1 DATA 1 DIDN'T CHANGE	*	-	-	-
2 DATA 1 DIDN'T FLASH	*	-	-	-
3 DATA 2 DIDN'T CHANGE	*	*	-	-
4 DATA 2 DIDN'T FLASH	-	-	*	-
5 FACE DIDN'T CHANGE	*	-	*	-
6 FACE DIDN'T FLASH	-	*	*	-
7 MISFIRE TO DATA TIMEOUT	*	*	*	-



## NOTES:

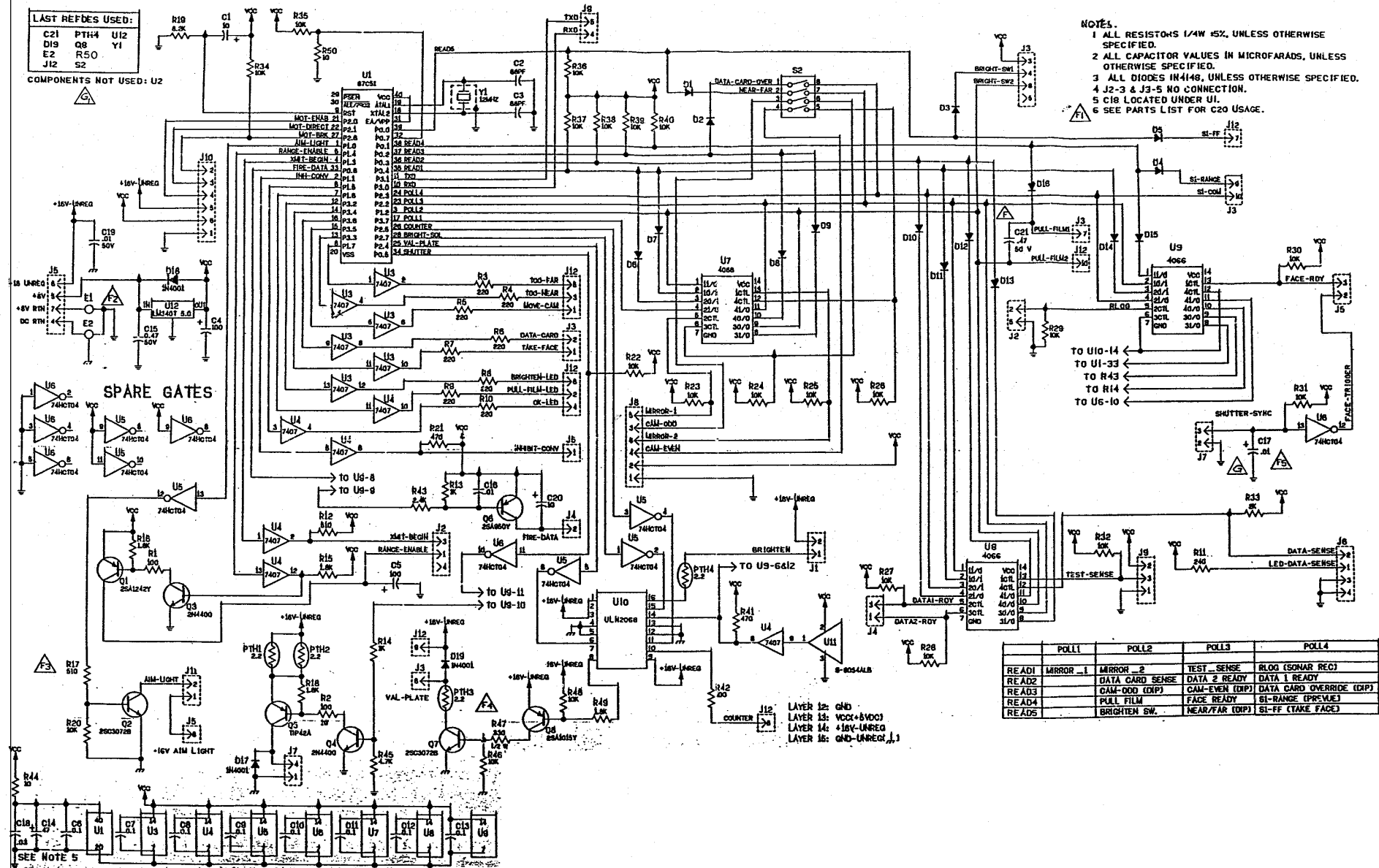
- 1) Recharging time.
- 2) Closed Circuit Input.
- 3) Camera Back movement by Operator.
- 4) At Even only. At Odd the Data Card Prompt returns on.
- 5) The 10 sec. time out can be reset if it has expired by S1-1. S1-1 and S1-2 can be performed during Rim Light operation.
- 6) A bar ("cmd") indicates on when low.
- 7) The spikes occur only while S1-1 or S1-2 is depressed.
- 8) The spikes do not occur during S1-1 being depressed.

## COMMENTS:

- A) When Mirror1 and Mirror2 are low then the Mirror is at the Data position. When they both are high the Mirror is at the Face position. Other states indicate that the Mirror is moving.
- B) This function can be initiated at any time after Power up, but will not occur until S1-2 is depressed.
- C) Test Sense is switched or initiated by installing interfacing harness at J9 on the logic board and then exercising the Camera by communicating to it with an external Computer.
- D) Data Card Override and Near/Far are set by switch S2. They are shown for the most common configuration.
- E) Only one of three will light up after Ranging. After the first Range occurs the LED which is on will remain on until the next S1-1.

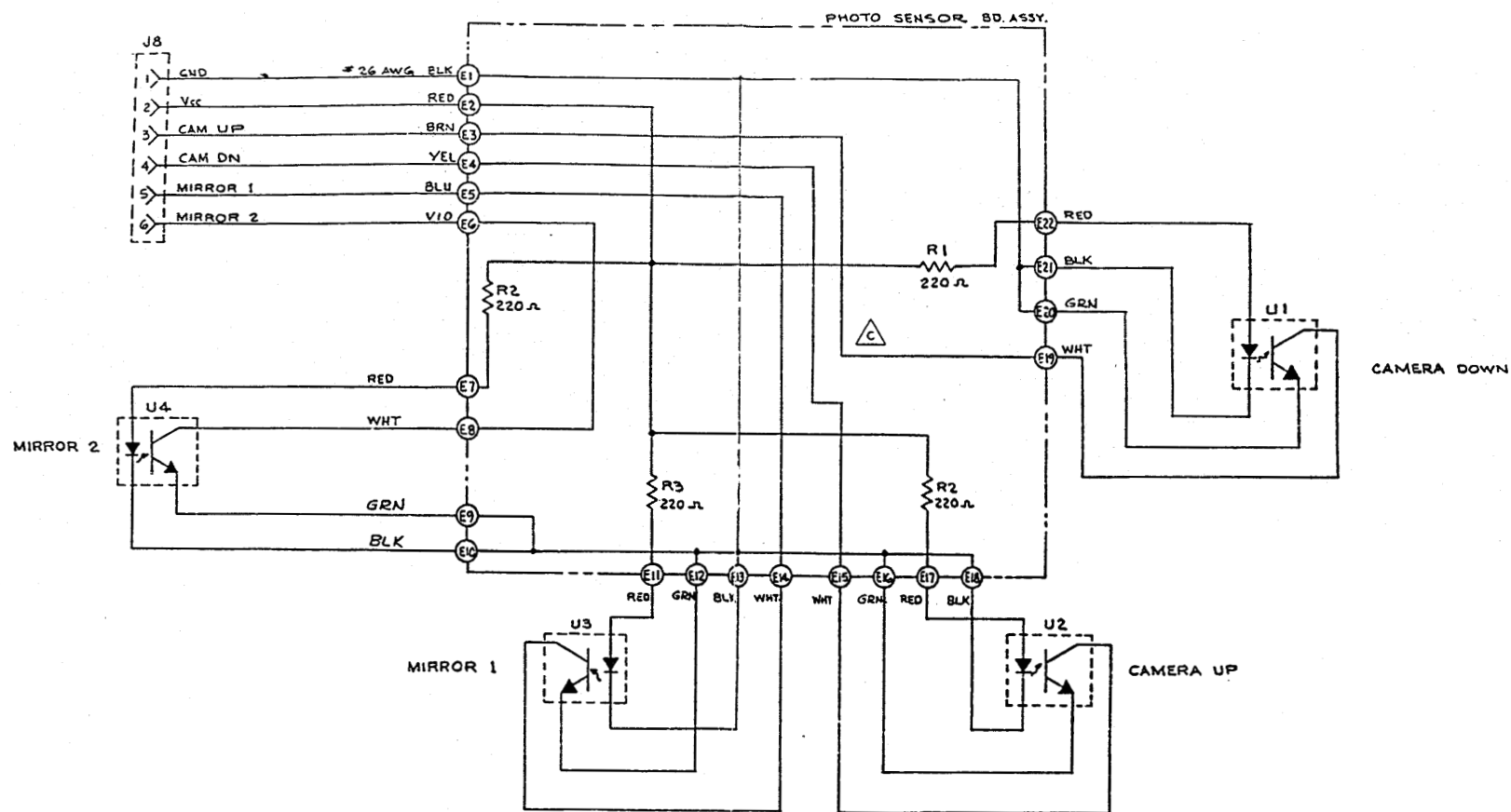
A5

## SYSTEM TIMING CHART



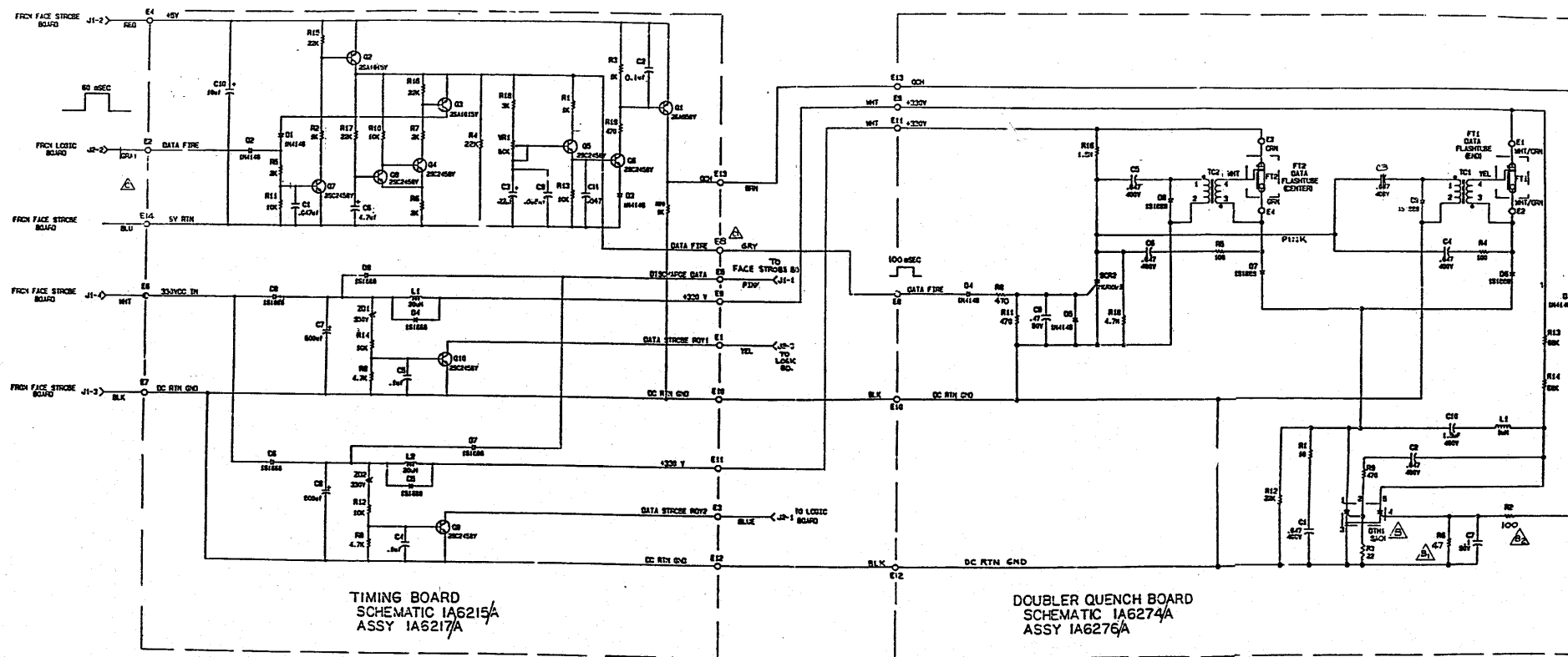
A7

# PHOTO SENSOR BOARD SCHEMATIC



- NOTES:
1. ALL RESISTORS ARE  $\frac{1}{4}$ W, 5%, C.F. VALUES ARE IN OHMS.
  2. ALL PHOTO SENSORS ARE OPTEK OPB39#N55 OR SENISYS S89#-N55.

DATA STROBE (VOLTAGE DOUBLER, SYNCHRONOUS TRIGGERING)  
SCHEMATIC 1A6273/A  
ASSY 1A6338/A



A8

DATA STROBE DOUBLER





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